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ESSAYS, MONOGRAPHS, AND CASES.

On Pyæmia. By H. P. Dewees, M.D. (Read before the N. Y. Medico-Chirurgical College, April 12, 1860.)

Gentlemen—At the last meeting of the College, I had intended to open the subject proposed for the discussion of that evening, Pyæmia, but owing to the lateness of the hour, and to the impossibility of exposing my views on a subject of such extensive physiological and pathologic relations, I asked, and received, permission to defer the discussion until this evening, when I should read before you a paper that would define these views, and better admit of subsequent consideration.

The subject of Pyæmia is so extensive in its relations, that its entirety cannot be encompassed in the limits necessarily attached to this paper. The attention of the College, therefore, will only be called to those most prominent pathologic attendants which at different times have been enunciated by me during the last fifteen years. But, before entering upon the discussion of the morbid phenomena, it will perhaps be more satisfactory to state some of the histological and normally mature relations upon which these views are based. And I would desire to be understood, that I do not here mean by Physiology, the study of the laws of life, as commonly defined; but the study of the dynamical relations of organic structures. Thus defined, physiology becomes correlative to histology and minute anatomy. Nor, by

Pathology, do I wish to be understood the study of *dead* structures alone, but rather the study of *dying* structures, since any aberrance from the normal standard of health is a true pathologic progression. It is only by this knowledge of "progressive pathology" that, to the "ars medendi," can be insured a result approximating to certainty. The intercurrent history of any disease is not inscribed by the finger of death. It is to be studied in the early alphabet of commencing disturbance, typed in the numberless examinations of those dying from other causes, but in whom an accompanying disease could be traced from its beginning to its end. It is thus only, by combination from its Alpha to its Omega, that pathology can become the language of disease.

The chyle and lymph are to be regarded as the primary condition and source of the blood. Their elaboration is intrusted to certain glandular actions. The lymph-ducts everywhere accompany the blood-vessels, and pour part of their contents, at least, into the current of the blood, in which the cytoid lymph-corpuscle now becomes the white corpuscle of the blood. During the regeneration of the tissues, as well as in pure lymph exudations, an endogenetic action ensues, by which the corpuscles (now known as the cytoid corpuscles) are developed. These cytoid corpuscles are in every way identical with the white corpuscles of the blood. In their development, they are connected with the organic transformations of the plasma into tissue, and probably are the resultants of the primary regenerative action, by which the albumen of the afforded pabulum is converted into the various structures, by contact with the relative organic substance, in accordance with the law for the reproduction of organized similitudes.

The white corpuscles of the blood are subject to variation, not only as to their constituent composition, but also as to their number in proportion to the red, their density, and their contents. They contain less iron, but more fat, and have distinct nuclei; whilst no true nucleus exists in the red corpuscle. Their proportion to the red seems to vary according to the rapidity of structural demand. In the young, the proportion of the white to the red corpuscle is a third more than in the adult; whilst during menstruation and pregnancy, in which periods an almost similar corpuscular amount exists, the same proportion, when compared to the non-menstruating state, attends.

It would appear, therefore, from these and other facts, that in the normal condition, the white corpuscles are the indicators of the nutrient activity in the lymph itself, as they do not of themselves enter into structural repetitions, but are the products remaining after primary

assimilation. They thus indicate by their proportion, diminishing or increasing beyond the normal amount in the blood, one of two conditions. Namely, the supply of food being the same, that the clear nutrient lymph has been consumed by the assimilative demand, with a less amount developed into the cytoid or white corpuscle; or, that the lymph has been supplied too profusely for actions of repair, and has been unassimilated and undergone corpuscular change, their excess being proportioned to the quantity not used. This view is corroborated by the examination of the blood in health, and in the abnormal condition called leucocythemia, in which the white corpuscles are in proportional excess. It is now to be remembered, that the products of the food, the chyle and lymph, are not immediately changed into red blood. Like that poured into the right heart by the thoracic duct, the lymph-vessels pour their contents into the blood-vessels in the various portions of the body, and afterwards the aggregated amount is subjected to the action of the lungs, which in their turn must be nourished, and submit their unused portions to the oxygenating process of the air-cells.

Development of the Cytoid Corpuscle into the White Corpuscle.—The white corpuscle is then to be considered as the cytoid lymph-corpuscle, in a state of organic progression. When subjected to the action of the lungs, oxygen is absorbed, and its albumen having received its increment of that element, it is converted into soluble fibrin, whilst the watery contents are displaced, to pass off as vapor from the surfaces of expiration, or remain to hold the salts of the liquor sanguinis in solution. The culminative transition into the red corpuscle now ensues, by the elimination of the nuclear contents of the white corpuscle at once, and their endogenetic development; or by their progressive perfectioning, when submitted to the other organs in which the hæmagenic functions reside.

The red corpuscles, in this manner, owe their origin, in part at least, to the progressive morphoses of the white corpuscles, and hence it may be that the latter are the parents of the former. It is now that the liquor sanguinis is prepared to sustain the nutritive acts, after the active operations of the pure lymph have subsided. Hence we see how every portion of the nutritive supply is converted, and the demand for necessary renewal is made. The fibrillation of the fibrin, held in solution, is a vital act. It is necessary for the formation of the tissues, and when the supply is inadequate, or imperfect, changes of texture must necessarily ensue.

Transitive Changes of the Liquor Sanguinis.—The nutritive changes from the liquor sanguinis are effected in the transitive vessels, between

the arterial and venous circulation—the capillaries. The now perfected fibrin is evolved in its soluble state, according to the demand for the formative power of the various tissues, whilst the products of disassimilation are emptied into the venous radicals, to undergo the depurating processes of the excretory actions of the special organs. If this depurating process is interfered with by the derangement of any of these organs, then the extractive materials which should have been eliminated collect in the blood. Hence, the normality of the organic interchanges is disturbed, and the reductive changes are forced on other organs yet sound, but which may be disordered by this overtasking of the functions, and by the poisoning or reactive manifestations of the central or terminal portions of the nervous system.

The Red Corpuscle a Matured Product.—The red blood-corpuscle is, then, not to be viewed as directly concerned in the regeneration of tissues. They are the matured products of the nutritive act itself. Their chief function lies in their power of absorbing and holding in solution oxygen, and giving off carbonic acid and other gases, generated during the interchanges of nutrition, whereby the heat of the body is, in part, maintained; and this takes place not in the lungs alone, but wherever nutritive reactions ensue.

The liquor in which the red globules are suspended corresponds chemically with the lymph, there being rather less fibrin in the latter, as might be anticipated from the statements just offered, whilst the albumen is richer in the former. Lymph, then, is not to be regarded as derived from the blood itself, viz., the red and white corpuscles and the liquor sanguinis. But the blood is derived from the chyle and lymph. From these, in the human embryo, the blood in the second month is developed. Whatever influence the vessels themselves possess in the elaboration of the blood is not yet satisfactorily explained, although direct absorption by the veins is acknowledged, and may account for the increased quantity of albumen in the liquor sanguinis over that of the lymph.

Degenerative Cytoid Conditions.—It is to this disposition of lymph exudations to cytoid development that I would now call attention. It is the key to the comprehension of the formation of pus, and its morbific dissemination, called Pyæmia. As nutrition is compounded of assimilation and disassimilation, so is pus a resultant of degenerated cytoid corpuscles, and of the dissolution of the structures affected. If the condition, known as inflammation, should arise, the amount of local assimilable lymph may be increased at first, but is afterwards diminished. The organic nerves are excited, the capillary vessels become

lessened in calibre, fibrin is locally generated, the blood is hurried more rapidly through the part, whilst structural reactions are more or less deranged. Hence, in the very onset of the inflammatory process, disorder of local nutrition is established. In other words, normality—the highest state of vital action—is impaired. The plasma is prevented from being organized into true tissue—the cytoid corpuscle is more or less degraded, and tends, by retro-morphosis, to degenerate into pus, an effete corpuscle, no longer subservient to the uses of the economy, since its arrest of development (from the original cytoid condition) into the white and subsequent red corpuscle is effected. Unless the constitution is vitiated, or the local cause has been greatly depressent, the exuded lymph resists a rapid degeneration into pus, as seen in fresh wounds, wherein this change sometimes is not effected for many hours. The transitional grades may readily be perceived by even the unarmed eye. This persistence of vitality in lymph is taken advantage of in endeavoring to heal a wound by what is termed "first intention." But if the individual be impoverished by disease, or his vitality be lowered, this persistence in the material for repair is lost, the organic cells become more or less vitiated or degraded, the nervous centres, or their terminations, are either irritated or depressed, exterior influences are unrestrained, and pus is early generated; or a sanious ichor proclaims the beginning of local chemical change. In the first condition cited, fibrillation is perfect; whilst in the second, its rapid disengagement (as of the other structural portions) into carbureted and sulphureted hydrogen, announces that chemical change is stronger than vital resistance. These are cases where pus has an exterior exit—not, as in pyogenic formations, inclosed in deep cellular or parenchymatous organs, where natural opening or surgical equalization, by the knife, cannot be attained.

Action of Nature in Pus Formations.—The action of nature is different in these cases. When art cannot reach the part, the pus remains localized as an abscess in the structure, or it is deposited in the cellular spaces; and its removal is to be effected, either by its being carried by chance into some patulous-venous orifice, with future impedimentary risk, or, by a series of auxiliary efforts of the capillaries and absorbents. The fluid portions are taken up; the granular portions, if disintegrated, enter the patent capillary vessels, (the dilating influence of the emitted gases, perhaps, aiding,) and their transmutations into excrementitious matter with excretory disengagement, may or may not ensue.

It is worthy of remark, that the retained pus-corpuscles of abscesses are smaller than those from open wounds. Pus contains not only an

albuminous material, but its granules are largely compounded of fat. Hence the emaciation which follows large suppurations.

If the disintegration of pus into its molecular basis, is not perfected in its transition to and through the excretory organs; in other words, if the lungs, liver, kidney, and other excretory organs and surfaces cannot resolve them into excrementitious, gaseous, or fluid excretions, the portions so incarcerated may become the foci of disorder of local nutrition, and thus superinduce pyæmic changes. It is thus that structural changes ensue in an organ, distal to the originating point of suppuration. Generally, the induced derangements are more of function than from absolute decadence of structure. Yet this sometimes does ensue, not in one organ or locality, but in several; and thus pyæmia is established. But it is the pyæmia of the structures, and not the pyæmia of the blood, in which the white corpuscles are everywhere degraded by a *toxic* element; and the red, long unfit for their normal uses in the economy, are in a condition approaching dissolution and decay.

It is to be remembered that the prominent outlines of pyæmic formations are only delineated, and that I am not describing the various processes of inflammation. This subject will be more fully entered on by our Fellow, Prof. Peaslee, in his following paper.

Corpuscular Pus never Absorbed.—Pyæmia, as now generally understood, is owing to the retention, dissemination, or generation of purulent or putrescent matter in the blood. True pus (i. e., in its corpuscular state) is never absorbed, as has been often stated. Artificial pyæmia may be caused by the accidental or intentional introduction of extraneous substances, with their subsequent arrest in the smaller vessels or capillaries. If phlebitis, or capillary inflammation is established, the coagulation of the blood in the injured vein may ensue, as an apparent means or attempt at arrest of further morbific propagation. The clot may soften, shrink, and dissolve in part into a pus-like fluid, leaving, after the absorption of the watery portions, a debris of mixed albuminous material, sometimes resembling tubercle. Or infarction of the capillaries may ensue, (sometimes designated "apoplectic spots,") with local and surrounding textural degeneration into pus, the severity of the symptoms depending chiefly on the quality of the disorganizing mass, the constitutional conditions, and the organic value of the part itself. But this is a mere artificial pyæmia—innocent in its general conditions. It is not a *septicæmia*, in which the element is toxic and infectious. One partakes more of the nature of an infiltration;

whilst the other is a true purulent infection. For we many times have phlebitis attended with obstruction without pus infection.

Fibrinous Concretions.—Consolidated fibrin may break off from the valves of the heart, or from other parts, and be arrested in the pulmonic or systemic vessels, according to its location; and although it may soften and be dissolved into a purulent fluid, still the symptoms and the danger are more of obstruction than of contamination, and more of situation than of pathologic propagation. If located in the small vessels of the heart itself, giving rise to abscess, with discharge of pus into its chambers, or into the large vessels, coagulation may ensue, and life be suddenly cut short. Here the pus is impedimentary—not poisonous; or, the concretion may be carried into the lungs, giving rise to lobular congestion, or capillary apoplexy, with subsequent pus-generation; or, it may be carried into the brain, producing derangements of intellect, of sensation, or of motion. In all these cases, though pus may be produced, and the organs more or less deranged, yet the symptoms and the danger to life are more from local injury than from debasement of the vital force from purulent infection. But if the vitality of the blood has been lowered conjointly with that of the nervous system, then the local pathologic conditions are altered, sloughing or gangrenous dissolution may ensue, and thus a pyæmia be established, both local and general; and many of these cases pass for rheumatism, pleurisy, pneumonia, and other disorders, having "*itis*" as their termination, and have been consequently treated by depletory remedies, when the treatment should have been sustentative.

Preference of Pyæmic Locations.—The lungs are more prone, in pyæmia, to be early affected, as the purulent or septic materies is thrown into the right side of the heart, and thence into the pulmonic capillaries. Their physiological position as eliminators of morbid blood products, and the vital affinity that attracts to them the white corpuscles, especially for oxygenating purposes, offer the best reasons for the frequency of this pathologic impairment. If the morbific material has been forced on to the systemic side of the heart, the brain, liver, spleen, kidneys, &c., may become the seat of the affection. Another source, however, may arise, especially in injuries below the chest, from the introduction or arrest of the pus or septic animal matter, in the portal system, by the returning sub-venous currents; and this may be perfectly independent of any phlebitis of the immediate portal circulation, or of inflammation of the hepatic artery.

Pyæmic Pervasion.—A third form of pyæmia may arise, wherein every portion of the body becomes affected—lungs, heart, liver,

spleen, serous membranes, muscular structure and surface. And this grave condition ensues not so much from local purulent absorption *in se*, as by the degradation of every tissue, from degenerative elective actions of local nutrition, and from impurity of the plasma afforded. Unless we have been able to trace the early history of the patient's condition, an error is not unapt to be made in the diagnosis. Since our attention is more directly called to the patent symptoms of inflammation of the serous membranes, such as pleurisy, peritonitis, &c.; or when in parenchymatous organs, to the lungs, liver and spleen, from the exudative reactions offering in these parts. But nature here points out a most valuable lesson as regards treatment, but which our fathers neglected, as well as some of ourselves continue to do. The exudation, or so-called inflammatory product, *although lower than the normal nutritive plasma*, is yet higher than pus, and into this it would degenerate by any lowering plan of treatment. Both physiology and pathology dictate the contrary. The patient must be sustained by food, and alcohol especially, which has the power, as has been before stated by me, of arresting the too rapid decomposition of albuminous compounds.

In many of these cases there is no pericarditis from bursting of an abscess in the outer wall of the heart; there is no peritonitis from matter irrupting into the abdomen; or from a suppurating liver. There is no localization, no arrest with disintegration, or restrictive exudation; every organ is poisoned, and death results from the pervasion of molecular disorder of the whole fabric. And what does morbid anatomy show in autopsy? Sometimes absolutely nothing to the naked eye, save a few ecchymotic spots here and there, but no great depots of putrid pus; no ulcers with circumscribed borders, to show the effort of nature towards reparation. There is no witness standing forth from the dead organs; yet, in every fibre and in every molecule, there lurks the hidden attestor, proclaiming that the pathology must be studied in the *dying* as well as in the dead structures.

Superficial Pyæmic Elimination.—But the internal organs do not always bear the brunt of the disorder. The skin may either become the eliminating depot, the channel for blood depuration; or it may be the locale of the toxic introduction. This may happen in several ways: 1st. The natural eliminative capacity may reside in the surface. 2d. The septic introduction, or delay, may be in the integumentary capillaries, or in the superficial lymphatics. 3d. The peripheral nervous system may be paralyzed, or poisoned.

The prognosis in these cases is more favorable, in many respects,

than in internal pyæmia; since the bursting of an abscess externally, or superficial ulcerations, are comparatively harmless as to contents and local value, whilst the treatment can be better applied and watched as to effect.

Pyæmia of the Joints.—There are other surfaces in which pyæmic exhibition or infection ensues; namely, the joints. As mentioned by me in my article on "Rheumatism of the Epithelial and Non-epithelial Tissues," the joints are more prone to become affected when the kidney is diseased, and especially after exanthematous disorders.

The joints are also liable to suppurative destruction, when the internal structure of a bone is injured or diseased. Hence, after amputations and fractures, especially compound fractures, with ends of bone more or less exposed, the disposition to pyæmia is most frequent. Statistics show that nearly one-half of the unfavorable results after amputation arise from pyæmia. The tissue operations are comparatively exempt from this complication, if are excepted those of perineal section of stricture, of lithotomy, and of the rectum. In post-puerperal states, the sterno-clavicular joint not unfrequently becomes affected, as stated by Dr. Todd, from pyæmic disturbance, with abscesses extending into the surrounding muscular structures. *The symptoms and cause are generally mistaken for those of rheumatism.*

Amongst what might be termed the natural causes of pyæmia, the most frequent arise from abscess in the leg, or purulent septic matter taken up from the uterus and the circumjacent pelvic organs. But bone seems a most favoring source for the transmission (if not for the absorption) of the purulent poison. The cancellous structures and haversian canals offer a ready conduction, whilst the stationary calibre of the vessels, from their adherence to the sides of their conducting canals, affords an additional source of entrance into the circulation. It is very certain that after injury, or other textural disturbance of the bones of the head especially, pyæmia is by no means an unfrequent complication. And, as before mentioned, the seat of the purulent retention is generally in the lungs and its serous coverings; whilst death may suddenly ensue from the coagulation of the blood, rapidly produced by some forms of pus, even in the interior of the heart itself. The shock to the nervous centres, by the blow or other causes, however, comes in for a participation in the pyæmic formations. In these latter cases, the depositions result more directly from the disturbance of the nutrition of the tissues themselves, than from *thrombosis* or embolic arrests, ushered in by coagulation or capillary apoplexies. These cases, whether from absorption

of the toxic elements of pus, or from depraved nervous changes over nutrition, are most resistant to treatment; since the fibrin is either not evolved, or it is of a soft flaky kind, indisposed to fibrillate, and readily breaks down into a pus-like fluid. The disorder, when so located, is frequently termed lobular pneumonia. In many cases of pyæmic localization in the lung-tissue, and its serous covering, as well as when in the joints or their neighborhood, I have known it diagnosticated as rheumatism, the *pain*, and not the *process*, being diagnostically considered; and such, I understand, was the belief in the case of one of our late eminent physicians.

Influence of Suppurative Surfaces in the Debilitated.—During low states of the constitution, any suppurative act may induce the pyæmic condition. It has followed gonorrhœa in the already debilitated, and especially if accompanied by perineal abscess. Though the vessels are anatomically more patulous in this region than in many others, yet the septic influences depend more on the particular diathesis than on the mere admission of pus itself into the larger vessels, or by its capillary reduction. Typhoid fever is also apt to induce pyæmia, by the absorption of the half-putrid contents of the bowels from glandular ulcerations and sloughing, as well as from the inability of these glands to depurate the blood from its excrementitious impurity. Sometimes the mucous membranes throw off vast quantities of puriform matter, and hence arose, in great measure, the term "secretion of pus." But pus is never secreted—it is an effete material, and as such it is excreted, as no longer serving vital uses. For pus is a product of change—it is not a process—it is the de-vitalized result of blasted organization, and hence it is neither secreted, nor has it the power of organic re-formation. In those cases of erysipelas attended by suppuration, but which may suddenly, in the progress of apparent cure, eventuate into pyæmic symptoms, the constitutional damage (in many individuals) has been antecedent to the erysipelatous irruption, from more or less chronic disorder of the kidney especially; the lowering of the nutritive assimilations being attributable more to the uræmic condition, than to any special toxic infection from the absorbed pus.

In considering this subject, the space allotted me has been encroached upon by the histological, physiological, and pathologic recital of the normal and abnormal blood conditions, with some of the many existing structural changes. The remaining space will be occupied by a more condensed exposure of my views on the *rationale* of treatment.

Treatment.—This should be decidedly sustentative. But here comes the difficulty, to know how much animalized food can be safely borne, and how much hydro-carbon can be advantageously administered in

the shape of alcohol. I say *safely* borne, since it must be remembered that the blood is already overcharged with the animal products of decaying pus and rapidly wasting tissues. Assimilation and assimilative power are so brought to their lowest conditions, that the lymph and cytoid corpuscles are robbed of their normal capacity, and have impressed on them a predisposition to assume lower organic forms, down to pus itself. It is thus that pus begets pus.

The organic balances, then, are to be accurately studied, to determine the exactitude of treatment. If the eliminatory organs are equally impaired, or are equally overworked, alimentation and alcoholization must be proportioned, so as to keep the remaining constitutional power at the *effort guage* it is capable of working under. Above or below this standard is injurious, or tending to fatal result. For if above, the nervous system is forced beyond its legitimate condition for recuperation; if below, besides the increasing blood depravity, it is subject to molecular degradation in its own structure. Generally, this proportionate equality in the standard of the eliminatory organs does not attend. The kidney may be defective, whilst the lungs are comparatively sound, and making great effort to throw off, by ammonia, carbonic acid, and vapor, the additional amount imposed on them for elimination. Or the liver may have been submerged in its functions, and with a defective kidney, add to the vast constitutional poisoning by the imperfect excretion of bile so essential to primary nutrition, and by the non-excretion of the products from the blood, now pus-poisoned.

Thus, there is no exact constitutional level; assimilation is at a low ebb; reproduction is fast yielding to destructive resolution; and chemical changes threaten the whole system. What can be done to cause this havoc to stand still, or that will drive death beyond the precincts of life? Will alcohol, a nervo-stimulant, but a hydro-carbon, do it? Will it, in a blood already surcharged with the destructive products of disassimilation, and the emunctory organs paralyzed in their function, will it form the remedy to sustain life, or will it fail to strengthen and repair? The lungs, laboring like some Vulcan at the bellows, can they escape the immutable law that assigns a doom to every organ overtaxed in its functions? Can they live through the deadly corruption that attraction fastens on their textures?

These are questions that must arise in the study of the treatment; and, although the broad basis of sustentation must be stood upon, still it becomes the question, what other remedy will keep the vital powers in their normal action, without adding to the load of the re-

tained elements now overwhelming the system? Is alcohol the only platform upon which the foot of success can rest? Or will other remedies, having no oppressive re-formations, and whose bulks do not inconvenience the stomach, whilst their influence is special and tonic, but not tumultuous, will they in practical result, as well as in theory, sustain the powers of life better, or even as well, as alcoholized remedies?

It is to be remembered that I am speaking of those cases in which the great eliminatory organs are either diseased or paralyzed in their functions. There is no doubt, where these organs can sustain the elimination of the plusages of carbon, &c., that alcohol forms a most trusty remedy. It is not so much by the sustentation of the nervous system, as by its affording free carbon for oxygenation, in place of that combined in the tissues, especially in the fat so essential to the brain and nerve-formation; and also by its inherent property of retarding the too early retro-morphosis of albumen, which, as stated by Prof. Peaslee, is the *pabulum* of the tissues. But I have cited cases where the impediment to functional excretory action is great; where, besides carbonic acid, the lungs exhale putrid nitrogenized matter, held soluble in their vapor, and tainting the breath with its descriptive fœtor. Thus the stone of Sisyphus,

"Ingens et non exsuperabile saxum,"

is ever rolling back on the weakening arm of life. Have we in bark, in its alkaloids of quinia, chinoidine, &c., in arsenic, in corrosive sublimate, and the like, have we properties of sustentation as well as of molecular septic retardation? It is only by such investigation and faithful observations that medicine can make its approach to a scientific basis. For a man may be as thoroughly drowned in his own fluids—the great centres of life, circulation, innervation and respiration, may be as surely submerged and extinguished by induced internal conditions, as though the individual were sunk full fifty fathoms deep.

Fact vs. Theory.—But these theories, so expressed, are more specious than feasible. It is to be remembered that the blood is not burdened with the materials of assimilation, but with the effete and putrescent products of *dis*-assimilation. The waste is greater than the repair—and that waste is not an organic debris, but a poison. Then alcohol, in *regulated* quantities, is not only a food, but it becomes an arrester of dissolution and decay. It is to *alimentation* that our attention and care must be turned. For more die from the overcrowding of nitrogenized food than of carbonized remedies. The beef-tea, and not the brandy,

is to be watched. Oils, such as the cod-liver, are chemically and assimilably demanded; they supply the waste, whilst the alcohol, by its stimulus, sustains the nervous system, till the eliminative actions are consummated.

Alcoholismus.—It is true that the drunkard's acne-covered face, his bloated and ulcered limbs, his slavering mouth, and drowsy brain, seem to point the finger of distrust towards alcohol as a remedy in the pus-poisoned. But it must be remembered how, from neglect of cleanliness, of hygiene, of sleep in the mid-hours of the night, when stupor wastes and makes him wander, how this man of many errors falls under the ban of nature's broken laws—a bankrupt in all health. He is the poisoned witness of every debauchery, and of the *abuse* of alcohol; and acne, and ulcers, and atrophied peripheral nerves, both organic and sensory, tell more the tale of many vices than of one alone!

We have now considered some of the chief forms of pyæmia. One induced by pus localization—comparatively benign in its influence, although attended by disorder of local nutrition; the other, a true pyæmia or septicæmia, from the breaking down of exudation, with an additional internal toxic element from decay or putrefaction.

Cadaveric Pyæmia.—But there remains a third form from external introduction, as from dissecting and other wounds possessing a multiplying septic element. It is the pyæmia of inoculation, specific in its character. Like inoculation from variola, equinia, and syphilis, it produces certain changes in the nutritive fluids, or cells; but it is not subject to their type-life conditions of regularity, of duration, and manifestation. The retro-morphic changes generally are more persistent, the eventuations more hazardous, and the recovery therefore more tedious, and less frequent.

I will not further occupy the attention of the College; and in conclusion, will merely mention that I have intentionally refrained from dilating on the pyæmic complications of puerperal fever, as their consideration would call for more time than could be granted at this session. Nor have I given place to the symptomatology of pyæmia, as I did not consider it necessary to the intention of this article, and as the prominent features were known to all, whilst the discussion of those of the occult or mixed character would draw still more on your time and patience, now already overtaxed.

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The Physiology of the Circulation. A Course of Lectures delivered at the College of Physicians and Surgeons, New York, in the Fall Term of 1859. By JOHN C. DALTON, JR., M.D., Professor of Physiology and Microscopic Anatomy.

LECTURE VI.

(SEPTEMBER 28.)

Venous Circulation—Structure of the Veins—Their Inosculation—Pressure of Blood in the Veins—Fluctuating Character of Venous Current—Influence of Muscular Contraction—Of Respiratory Movements—Pulsation of Veins near the Thorax—Force of Aspiration exerted by the Chest—Its Effect on the Movement of the Blood—Experiment—Introduction of Air into the Veins—Mode in which it produces Death—Experiment—Introduction of Air in Surgical Operations—Cases—Symptoms—Instances of Recovery—Post-mortem Appearances in Fatal Cases—Means of Diagnosis—Introduction of Air by Vessels of Uterus—Recorded Cases—Case of Dr. Swinburne.

To-day, gentlemen, we shall pass from the consideration of the arterial to that of the venous system; from the study of the circulation of the blood in the arteries, to its course through the veins, in its returning passage from the capillaries to the heart.

You already know the general structure and arrangement of the veins, and the main peculiarities which distinguish them from the arterial tubes. I shall not, therefore, take up your time by dwelling upon these points, but shall ask your attention more particularly to the conditions which affect the movement of the blood in these vessels, and the variations of the venous circulation in different parts of the body.

Although the veins are provided with walls which are very much thinner and less elastic than those of the arteries, yet, contrary to what we might expect, their capacity for *resistance to pressure* is equal, or even superior, to that of the arterial tubes. Milne Edwards has collected the results of various experiments, which show that the veins will sometimes resist a pressure which is sufficient to rupture the walls of the arteries. In one instance the jugular vein supported, without breaking, a pressure equal to a column of water 148 feet in height; and in another, the iliac vein of a sheep resisted a pressure of more than four atmospheres. The portal vein was found capable of resisting a pressure of six atmospheres; and in one case, in which the aorta of a sheep was ruptured by a pressure of 158 pounds, the vena cava of the same animal supported a pressure equal to 176 pounds.

This resistance of the veins is to be attributed to the large proportion of white fibrous tissue which enters into their composition; the same

tissue which forms nearly the whole of the tendons and fasciæ, and which is distinguished by its density and unyielding nature.

The *elasticity* of the veins, however, is much less than that of the arteries. When they are filled with blood, they enlarge to a certain size, and collapse again when the pressure is taken off; but they do not react by virtue of an elastic resilience, or, at least, only to a slight extent, as compared with the arteries. Accordingly, when the arteries are cut across, as we know, and emptied of blood, they still remain open and pervious, retaining the tubular form, on account of the elasticity of their walls; while, if the veins be treated in the same way, their sides simply fall together and remain in contact with each other.

Another peculiarity of the venous system is the *abundance of the separate channels*, which it affords, for the flow of blood from the periphery towards the centre. The arteries, as you know, pass directly from the heart outward, each separate branch, as a general rule, going to a separate region, and supplying that part of the body with all the blood which it requires; so that the arterial system is kept constantly filled to its entire capacity with the blood which passes through it.

That, however, is not the case with the veins. In this injected preparation of the vascular system, you observe, we have two, three, four, or even five veins, coming together from the same region of the body. You will notice, also, that there are abundant inosculations between the different veins. The deep veins which accompany the brachial artery inosculate freely with each other, and also with the superficial veins of the arm. In the veins coming from the head, we have the external jugular communicating with the thyroid veins, the anterior jugular, and the brachial veins. The external and internal jugulars communicate with each other, and the two thyroid veins also form an abundant plexus in front of the trachea.

Thus the blood, coming from the extremities towards the heart, flows, not in a single channel, but in many channels; and as these channels communicate freely with each other, the blood passes sometimes through one of them, and sometimes through another.

We find, accordingly, that the venous system, as a whole, is not, in its normal condition, constantly distended with blood. One part of it, on the contrary, may be full, while another part is comparatively empty. One vein may be compressed, while another is left free; and a fluctuation of the blood, therefore, may readily take place from one portion of the venous system to another, as different parts are alternately filled or emptied.

On account of this arrangement, you will see at once that the entire pressure of the blood in the veins cannot be judged of in precisely the

same manner as that in the arteries. We found yesterday, in studying the pressure of the blood in the arteries, that this pressure was the same, or nearly the same, throughout the whole arterial system. It is the same in a large artery as in a small one; and the difference is not great, whether we apply the mercurial guage to an artery near the heart or to one at a distance from it. If we apply the guage to the aorta, we get the pressure of all the blood passing through this tube to the whole body; and the pressure indicated must be sufficient to distribute that quantity of blood to the entire system. If we apply the guage, on the other hand, to the femoral artery, we there find a quantity of blood, which is adequate for the circulation of the lower extremity, propelled by a corresponding force. These relations remaining the same throughout the entire system, the indications of the guage are not essentially different, whether we apply it to one artery or to another.

But it is not so with the venous system. In this part of the circulatory apparatus, the pressure diminishes, very distinctly, from the periphery toward the centre. It has been found that if the mercurial guage be applied, at the same time, to the carotid artery, the metatarsal vein, and the jugular vein, the column of mercury may indicate a pressure of 165 millimetres for the carotid artery, but only 27 millimetres for the metatarsal vein, and 9 millimetres for the jugular. Volkmann experimented in a similar manner upon a horse, and found that the pressure in the small veins of the neck was 44 millimetres, while that in the jugular was only 21½ millimetres. In a goat, the pressure in the facial vein was found to be 41 millimetres, and that in the jugular vein only 18. So that the cardiometer indicates a diminution of pressure from the arteries to the veins, and a further diminution, in the veins themselves, from the periphery toward the heart.

This is not, however, because the force, with which the blood is returned to the heart by the veins, is really less than that by which it is distributed outward by the arteries, but because its passage through the venous system takes place by so many collateral channels, which communicate with each other by inosculating branches. If we apply the mercurial guage, for example, to one of the veins of the extremities, it does not indicate the entire pressure of the blood, as it returns towards the heart; for a large portion flows off by other veins, and so finds its way back, by a different course, to the centre of the circulation.

A very ingenious experiment, by Poisseuille, has shown that this difference of pressure in the venous system is more apparent than real;

and that it is owing to the cause which I have just stated. If the cardiometer be placed, at the same time, upon the artery of a limb and upon its accompanying vein, we shall find, as I have said, that the pressure in the vein is much less than that in the artery. But if all the rest of the limb be surrounded with a ligature, so as to compel the whole of the blood to return by a single vein, the pressure in the vein will then be seen to rise, until it is nearly or quite equal to that in the corresponding artery. Undoubtedly, there are some organs in the body where the venous pressure would be even greater than the arterial, owing to an increase in the mass of the blood as it passes through the capillary circulation. But these variations I shall speak of more particularly hereafter.

The blood returns to the heart, therefore, by a considerable number of inosculating venous channels; and the pressure of the blood in the veins diminishes, for that reason, as we approach from the circumference to the centre.

There is another peculiarity of the venous circulation, still more marked than that which I have just described. It relates to the *physical impulses* under which the blood moves through the venous system.

In the veins, the blood does not flow with a regular rhythmical movement, like that of the arteries. In them, there is no regularly returning expansion and collapse, corresponding with the pulsations of the heart. The blood flows through the veins with an intermittent motion, it is true, but this movement is irregular, and not rhythmical. It is to be seen, more particularly, in the veins of the external parts of the trunk, in the neck and extremities; in all those parts, indeed, where the venous channels pass between muscles, or through the muscular tissue. The voluntary muscles, in these parts, are continually contracting and relaxing. Their contraction compresses the veins which pass between them, and thus drives the venous blood onward, in its passage toward the heart.

This movement is provided for, as you know, by the valves of the veins, which are so arranged that they open toward the heart, and shut backward toward the capillaries.

Here you have the jugular vein of a dog, which I removed this morning, cut open in such a way as to show the valves. They are arranged, as you observe, in pairs, upon the internal surface of the vessel. They have the form of membranous festoons; and by directing a stream of water or of air against them, in a backward direction, they may be made to fill out and become distended, with their convexities looking toward the cavity of the vein.

Here is the jugular vein of an ox, still unopened; by tying one end of it, and then inflating it with air, the position of the valves in the interior may be readily distinguished by the bulging prominences which show themselves at various points. These valves are mostly double, but there is one situated near the end of the vein which is composed of three distinct festoons. When distended, their edges come in contact with each other, like those of the pulmonary or aortic valves.

These valves prevent the regurgitation of the blood when the veins are subjected to external compression.

You will see, then, how it is that the venous circulation is influenced by the action of the voluntary muscles. This action is irregular, but nevertheless is constantly recurring, at nearly all periods of the day. The muscles contract, and drive the blood onward toward the heart. They relax, and the veins fill up again from behind. The blood is moved through the veins, not by a contraction of the walls of the veins themselves, but by that of the voluntary muscles situated outside of them. The action of the voluntary muscles, therefore, in the venous system, replaces, to a considerable extent, that of the heart in the arterial system.

The circulation in the veins, accordingly, differs from that in the arteries by the irregularity of its movement. The flow of blood in the arterial system is regular and rhythmical; in the venous system it is variable and fluctuating. The arteries are constantly full of blood; and the arterial pressure is constantly the same, or is varied only by the pulsations of the heart. The veins, on the other hand, are alternately filled and emptied by the muscular contractions, and the pressure varies in each vein, as its collateral branches are open or obstructed.

There is another peculiarity still, in the venous circulation, which I will not omit to mention. It is that the venous current is influenced, to a great degree, by the movements of the chest. If we examine any large vein in the immediate neighborhood of the thorax, we shall find that it alters very perceptibly in appearance with the movements of respiration. At every movement of expiration the vein becomes turgid, and at every inspiration it collapses again to its former size. Now, what are these movements of respiration, and why should they affect the flow of blood through the veins? We have already examined them to some extent, in connection with their effect on the arterial pressure. In the movement of inspiration, the air is drawn into the interior of the thorax by a lifting action of the ribs and a descent of the diaphragm. This is, in reality, a *suction* movement,

and, when it takes place, all the fluids are drawn into the chest which can gain access to its cavity—the air through the trachea, and the blood through the veins.

At each inspiration, therefore, the veins in the neighborhood of the chest collapse, and at every expiration become distended. This alternate movement of expansion and collapse is very marked whenever the respiration becomes rapid or laborious.

Now, you will recollect that this effect of the respiratory movements was very perceptible yesterday, when the mercurial gauge was applied to one of the arteries. We saw then that the pressure of the blood in the vessel was influenced by three different causes: *first*, the constant and steady reaction of the arterial system; *second*, the contractions of the heart, which produced an oscillation of five to fifteen millimetres; and *thirdly*, there was another oscillation, which was synchronous with the movements of the chest. At every inspiration the column of mercury fell, and at every expiration it rose to a higher level.

A somewhat similar experiment has been tried with the veins. A bent glass tube was introduced, by Barry, into one of the large veins near the heart, and secured by ligature. The other end of the tube dipped into a vessel containing a colored fluid, and at every inspiration the colored fluid was seen to rise in the tube, while at the moment of expiration it descended to its former level.

We find, therefore, that whenever the chest expands, the blood flows into it from the neighboring veins, in the same way as air flows in through the trachea; and when inspiration ceases and expiration begins, the veins fill again up from behind, and thus regain their original size. The force by which the blood is thus drawn toward the chest, by the respiratory movements, is called the force of *aspiration*.

In order to exhibit this action of the veins, I will now etherize the animal which we have here, (a cat,) and afterward expose the external jugular, as it passes down the neck. You now see the vein, running from above downward, over the anterior surface of the sterno-mastoid muscle. It is moderately distended with blood, but we do not see, as yet, any changes in its size, corresponding with the movements of respiration. There is no emptying of the vein at the time of inspiration, nor any distention at the time of expiration. This is because the portion of the jugular which we are now examining is at too great a distance from the chest, to show the effect of the thoracic movements.

If, however, we uncover a portion of the vein which is nearer the

entrance of the thorax, it will then, no doubt, be visibly affected by the movements of respiration. I now expose the vein farther down, dissecting away the muscles which cover it, nearly to the point where it enters the cavity of the chest. You see now that at the lower extremity of the wound, the vein becomes partially collapsed and emptied at each movement of inspiration; whereas at the upper part of the wound, where the vein passes over the sterno-mastoid muscle, no such movement is visible.

You can see, in fact, at the lower part of the vein two different movements at the same time. One is the alternate expansion and collapse of the vein, synchronous with the rise and fall of the chest in respiration. The other is a more rapid, tremulous motion, corresponding with the pulsations of the heart, the impulse of which is communicated to this portion of the vein.

Now, with regard to this force of aspiration exerted by the chest upon the venous blood, there are two circumstances which it is important to remember.

In the first place, in the ordinary condition of the respiratory movements, when the breathing is perfectly calm and regular, there is but very little visible effect produced upon the veins, even in the immediate neighborhood of the chest. The collapse of the veins at the moment of inspiration is hardly perceptible to the eye. I do not doubt that an effect is really produced upon the venous circulation even then, and that the flow of blood toward the heart is favored by the movements of the chest. But at this time, the force of aspiration is so gentle and uniform that the veins fill up from behind by the venous current as fast as they are emptied in front by the expansion of the chest. If you etherize an animal, therefore, as we have done in this instance, and then expose the jugular vein at the lower part of the neck, so long as the respiration is quiescent you will not see any marked fluctuation in the vein externally. It is only when the movements of respiration become hurried or laborious that this fluctuation becomes manifest. For then, the vein is emptied by the forcible expansion of the chest faster than it can fill up from behind, and of course it collapses visibly at each inspiration. As the breathing becomes more violent, the alternate movement of collapse and distention is more decided, and corresponds in intensity with the movements of respiration.

For the same reason, the venous fluctuation is most marked in continued struggling or crying. The breathing is then performed by long and continuous expirations, alternating with quick, short, and

violent inspirations. Accordingly, the veins suffer a corresponding distention and collapse at that time, when these movements would be hardly perceptible in the ordinary condition of the respiration.

In the second place, when the breathing is thus hurried and laborious, the force of aspiration only acts upon the veins *in the immediate neighborhood of the chest.* You saw, in the experiment which we have just tried, that while the venous fluctuation was quite visible in the lower part of the jugular, it was not at all so in the upper part of the same vein. Why is it, that this emptying and filling of the veins should take place at the upper part of the chest, and not in the middle of the neck? The explanation of this fact is very important in connection with the movement of the blood, and also in regard to a peculiar surgical accident which I shall speak of in a few moments. Why is it, then, that the venous fluctuation should be visible at this time in the immediate neighborhood of the thorax, and not at a distance from it?

It is simply because the walls of the veins are loose, flexible, and liable to collapse. They cannot maintain their tubular form, when suddenly emptied by the force of suction; and, therefore, when the veins are affected by the movements of the chest, not only is the blood which they contain drawn into the thorax, but their walls are at the same time drawn together, and the veins collapse.

We find, accordingly, that the emptying of the veins, by a violent inspiration, is not felt at a distance from the spot where the force is originally exerted.

We can see the same thing perfectly well, by experimenting upon any flexible tube with yielding walls. Here, for example, is a syringe, to the nozzle of which I have attached a flexible india-rubber tube with thin walls. I dip the lower extremity of the india-rubber tube into a vessel of water. Now, if I withdraw the piston of the syringe slowly and gently, the water is drawn up into the tube, as the blood is drawn through the veins by a quiet and easy inspiration. But if I withdraw the piston by a sudden and forcible motion, the walls of the tube, you observe, immediately collapse, and no water can gain admittance into the syringe.

This is precisely what happens with the veins, in regard to the movements of the thorax. They collapse so readily, in a forcible inspiration, that the only blood drawn into the chest is that which was to be found at a very short distance from its cavity. It makes a great difference, therefore, in the movement of the blood, whether the motions of respiration are performed quietly or forcibly. So long as the

respiration is quiet, each movement of inspiration draws the blood, by a gentle motion, from the whole venous system toward the chest; but as soon as the breathing becomes violent, the forcible expansion of the chest causes a collapse of the veins in its neighborhood, and no longer assists in the circulation of the blood.

There are various accidents, gentlemen, which are liable to happen during surgical operations, in consequence of injury done to the veins. One of these, of course, is hæmorrhage; but this, as a general thing, is the least important. In nearly all cases, venous hæmorrhage is easily controlled, except where a large number of veins have been wounded simultaneously. Compression or ligature is usually quite sufficient to arrest the bleeding. At one time, a great deal of dread was entertained by surgeons with regard to the ligature of veins; it being considered as hazardous, owing to the supposed irritability of these vessels, and their liability to become inflamed after the application of the ligature.

So far as I am aware, this feeling has very much diminished of late years. In regard to my own experience, I have found, as a general thing, in the lower animals, little or no difference in irritability between the arteries and veins. I tie the veins, in an operation, with as little hesitation as I would place the ligature upon an artery, and with no more anticipation of an unfavorable result. And I do not know that, in these animals, I have ever seen unpleasant consequences ensue.

A more dangerous, and still more dreaded, occurrence, which may sometimes happen in operating upon the veins, is the *introduction of air* into the venous system. This accident has received, from time to time, a great deal of attention from practical surgeons. In the early annals of surgery, cases of sudden death during operations were sometimes recorded, the reasons for which were not then understood, but which were afterward supposed to be owing to this cause.

There are one or two remarks which I wish to make at the outset, in regard to this introduction of air into the veins. The accident is not, of itself, so constantly and excessively dangerous as we might be led to suppose. It is often thought that in a surgical operation the slightest admission of air into the veins must be instantly and inevitably fatal; that the smallest quantity of aëriform fluid in the venous system is enough to paralyze the heart or the brain, and put a stop to all the vital operations. This, however, is certainly not the case. We may sometimes introduce a considerable quantity of air into the blood, without producing a fatal, or even an immediately serious effect.

The effect which *is* produced depends, to a very great degree, not

upon the simple fact that air is introduced, but upon the quantity in which it is introduced, and upon the manner of its introduction. It depends even still more upon the manner of its introduction than upon its quantity. A very small amount may be thrown into the veins of an animal at almost any time, without producing death; and even a large quantity, if thrown in slowly and gradually, may be almost equally harmless. It is only when a considerable quantity is introduced suddenly, that unpleasant consequences follow, and a fatal result almost necessarily produced.

Now, why is it that such a difference should exist in the effects of the same operation, done in two different ways? We shall see the reason for this difference, when we understand the mechanism by which air in the veins acts in producing death.

It is by its mechanical effect, and not by any chemical or poisonous agency, that air, when mixed with the blood, causes death. It is air *in an aëriform, and not in a liquid condition*, that blocks the circulation and paralyzes the heart. The gases of the atmosphere have no injurious property in themselves. In fact, both oxygen and nitrogen, as you already know, are normal ingredients of the blood, and are naturally held in solution in the circulating fluid. Accordingly, if air be introduced into the veins in small quantity, it is immediately dissolved by the blood, and, in that condition, does no harm. If even a large quantity be injected, so slowly that the blood can dissolve it as fast as it is introduced, it produces no bad effect, and passes without injury through the circulation.

But if the air be thrown in abundantly and rapidly, it fails to be dissolved. It then remains mixed with the blood in the form of gaseous bubbles, and interferes with the circulation to such a degree that death is very soon the result.

Now we can very easily see, by exposing one of the veins in this animal, (a cat,) and injecting air, that a small quantity does not immediately or necessarily produce death. I have already uncovered the femoral vein, as it passes up the inside of the thigh, alongside the femoral artery. I have here, also, a syringe which is perfectly air-tight; for you see, on dipping the nozzle into a vessel of water, that the slightest pressure on the piston produces an abundant escape of air-bubbles. We can, therefore, use the instrument for the purpose of injecting air into the vein.

I now make an opening in the vein, introduce into it the nozzle of the syringe, and slowly depress the piston to a certain extent. Thus far, you observe, no immediate effect has been produced on the circu-

lation, and yet air in considerable quantity has been introduced into the circulation, for I can hear very distinctly, on listening at the chest, a *churning* sound, which indicates that air is already mixed with the blood in the right cavities of the heart. This churning sound is a very curious phenomenon, and is almost always to be heard when air has been thrown into the veins in considerable quantity. For the air, immediately after its introduction, is carried directly to the right side of the heart, and is there whipped into a minute foam, by the motion of the tendinous cords and valves of the heart. This gives rise to a characteristic sound, like a moist râle, or double souffle, which may be heard through the walls of the chest.

In this instance, the air has been introduced so gently that the quantity which is now in the heart can undoubtedly be disposed of by solution, and therefore will not cause any serious injury. I no longer hear the churning sound of the air in the cardiac cavities, and I presume, therefore, that it has already been nearly or quite dissolved in the blood.

I will now, by means of the same syringe, force into the vein a larger quantity of air, and by a sudden motion; which, I presume, will prove fatal to the animal. I now hear again the churning sound of air in the right ventricle. The heart labors much more than at first, though, you observe, the movements of respiration continue, and the cardiac pulsations are still regular. Now, however, they are diminishing in force, and the movements of respiration, also, are already nearly at an end. You see, therefore, that the rapid introduction of air has proved fatal within a few seconds; while a smaller quantity may be introduced gradually, without any serious effect.

Now let us see what is the mechanism of this accident. How is it that air produces death, when mixed with the blood in an undissolved condition?

The air, when thrown into the veins, as we have seen, is immediately carried to the right side of the heart. It thence passes out by the pulmonary artery and its branches, to the capillaries of the lungs, and fills these vessels with finely-divided aëriform bubbles. But the capillaries present an obstacle to its further passage. The air clings to the internal surface of the minute blood-vessels, and becomes entangled in the capillary plexus. It can pass easily enough through the arteries, and through the veins; but it cannot readily find its way through the capillaries. The vessels of the lungs thus become blocked and obstructed, the blood is cut off from the left side of the heart and the arterial system, and in this way the circulation suddenly comes to an end.

It makes a great difference, therefore, whether we inject the air into an artery or into a vein. If we throw it into an artery, it is arrested in the capillaries of that region of the body alone, and only a part of the circulation becomes obstructed. But if we throw it into a vein, it is at once conducted to the heart, thence carried to the lungs, and the whole vascular system is then deranged, by the stoppage of the pulmonary circulation.

Now, in order to ascertain whether this be really the case, I will make an autopsy of the animal that we have just killed, and see what has become of the air which was injected into the veins. On opening the chest, you see, gentlemen, that the heart still pulsates feebly. The air contained in the right ventricle is distinctly visible through the pericardium, which is still unopened. You observe, also, some bubbles of air in the superior vena cava, into which it has passed by regurgitation from below.

You see, furthermore, that the pericardium is very much distended by the heart. The heart itself is so distended, and fills so completely the pericardial cavity, that it is difficult to pinch up the fibrous membrane with the forceps, and separate it from the surface of the heart. Now, however, I can succeed in cutting open the pericardium, and you see that the heart immediately protrudes through the opening, by a kind of hernia. Everything indicates an unnatural distention of the cardiac cavities.

This distention is owing to the presence of air. On striking the heart with the handle of a scalpel, you observe it returns a tympanitic sound, very similar to that of the stomach, and altogether different from the dull, solid sound of a heart filled with blood. We have, then, air in the superior and inferior vena cava, air in the right auricle, and air in the right ventricle. No doubt, there is air also in the pulmonary artery and its branches. But, in all probability, this air has not passed through the pulmonary circulation, and is not to be found in the left cavities of the heart.

In order to make this certain, however, I will first open the left cavities, and afterward the right.

I now open the left auricle and ventricle; and what escapes? Only a few drops of bright scarlet blood! Here is already, then, a remarkable difference in the appearance of the left cavities from what we saw the other day in the animal killed by stoppage of the respiration. In that case, both the left auricle and the left ventricle were distended, at the moment of death, with dark venous blood. Here, on the contrary, the blood has not been thrown backward upon the heart from

the capillaries, but has been stopped in its passage through the lungs. Accordingly, there is but little blood in the left ventricle, and that little is of the natural arterial color.

You see, furthermore, that there are no bubbles mixed with the blood in the left cavities of the heart. The air, therefore, has not passed through the pulmonary circulation.

I will now open the right auricle and ventricle. Immediately there escapes a large quantity of bright frothy blood, formed of minute bubbles of air intimately mixed with the blood, and beaten up into a foam by the action of the heart. It is this foam which obstructed the capillaries of the lungs, and put an end to the pulmonary circulation.

Now, these are the appearances usually found on opening an animal, killed by injection of air into the veins. Air in the vena cava, air in the right auricle, the right ventricle, and the pulmonary artery; but none in the pulmonary veins, nor in the left cavities of the heart. The ordinary pressure of the circulation is not sufficient to force the air through the blood-vessels of the lungs. Still, this may be effected by a greater amount of pressure. If we inject the air forcibly into the veins, under a steady and continued pressure for thirty or forty seconds, we may overcome the resistance of the capillaries, and compel some of the air to pass through them. Under these circumstances, air-bubbles may be also found, in small quantity, in the left side of the heart.

I have myself succeeded, in this way, in forcing air through the capillaries of the intestine, by insufflation into the mesenteric arteries. The air passed by the portal vein into the liver, and immediately appeared in minute bubbles in the interlobular spaces, giving a pale, mottled appearance to the surface of the organ.

The animal was allowed to remain alive for a few minutes, and during this time the appearance of air in the interlobular spaces disappeared altogether. The animal was then killed, and air was found in the veins of the liver, and even in the right side of the heart and the pulmonary artery.

In another instance, air was blown very forcibly into the mesenteric veins of a cat, and appeared, after about five minutes, in the right cavities of the heart.

In a third case, however, though the air was thrown with some force into the mesenteric artery, it did not appear afterward, either in the interlobular spaces of the liver, or in the right cavities of the heart.

It is the capillary vessels, therefore, that create an obstacle to the passage of air in the blood. Usually this obstacle is complete; but sometimes, if the pressure be unusually great, or if the animal survives

a certain time, a little of the air may pass through the lungs, and appear in the left side of the heart.

Now let us see, gentlemen, how it is that air gains access to the veins in surgical operations. There are two modes in which this accident may occur. The first is by the careless use of the syringe in making injections of medicinal substances into the veins. You are aware that this method of administering remedies has been suggested, and occasionally practiced, in certain morbid conditions. The transfusion of blood has also been resorted to in cases of extreme exhaustion from hæmorrhage. In cholera, saline solutions have been injected into the veins, for the purpose of restoring to the blood the fluids which it has lost by diarrhœa.

In these cases, if the ordinary syringe be used to make the injection, a little air is very apt to be drawn into it, together with the liquid solution, when the syringe is filled; and unless particular care be taken, some of this air will be thrown into the veins, either at the beginning or at the end of the injection. In order to avoid this danger, the syringe, before introducing it into the vein, should always be held for a moment in a vertical position, with the nozzle pointing upward. The air which it contains will thus float upward toward the opening of the tube, and by gently pressing the piston all the air can be driven out in advance of the liquid. The nozzle of the syringe should then be introduced into the vein, taking care meanwhile to maintain a continuous pressure upon the piston, so as to keep the point of the instrument filled with liquid. When once the nozzle is fairly secured in the vein, the injection may then be made without fear.

But there is another mode in which air finds its way into the blood in surgical operations, which cannot be so easily guarded against; that is the accidental or *spontaneous* introduction of air into the veins. In these cases the air enters, of itself, into veins which are wounded in the ordinary way, in the course of surgical operations. Let us see how this accident happens, and what precautions are required to guard against it.

It has been known for many years that the wounding of veins *in certain parts of the body* is attended with risk of the introduction of air. The first case of this kind, in which the nature of the accident was recognized, happened in the year 1818, at the Hospital St. Antoine, in Paris, under the care of M. Beauchêne. A young man entered the hospital for a tumor, situated at the top of the right shoulder, and extending from the spine of the scapula to the superior border of the second rib. The tumor involved a portion of the clavicle; and in

the operation for its removal, as this bone was found to be diseased, it was determined that a part of it should be exsected. The clavicle was accordingly sawn through, near its articulation with the sternum. It was then lifted out of its bed, and everted, and the dissection continued beneath it, for the purpose of detaching it from the neighboring parts. At this moment a hissing sound was heard, like that of air penetrating into the pleural cavity. The patient, who had hitherto borne the operation remarkably well, immediately grew pale and faint; the pulse became rapid, hard, and irregular, and there were convulsive movements of the limbs. The hissing sound was again heard, during some manipulations which were employed about the wound, and notwithstanding the use of every means for resuscitation, the patient was dead at the end of fifteen minutes.

At the autopsy, it was found that a portion of the external jugular vein had been cut away, just above its junction with the right subclavian. Through this opening the air had introduced itself into the circulatory system, and had destroyed life in the manner which I have already described.

Since that time, other similar instances have occurred in the practice of Dupuytren, Delpech, Castara, Roux, Bouley, and others. Dr. John C. Warren had a case, which he regarded of the same kind, in 1830, and another in 1831; and at the present day, the possibility of such an occurrence is acknowledged by all practiced surgeons. In the case of Delpech, the body was examined next day, after having been submerged in a large vessel of water. The right side of the heart, which was very much distended, was opened beneath the surface of the water, and the gaseous bubbles which escaped were collected in bell-glasses. They were afterward examined, and found to consist of atmospheric air.

In the case of M. Roux, the gases from the right ventricle were collected, and examined in a similar way, and were also found to consist of atmospheric air.

Now, there are various facts in relation to this accident, which it is necessary to bear in mind. In the first place, spontaneous introduction of air into the veins will not take place, as a general thing, except *in the immediate neighborhood of the chest.* In all the cases which I have cited, the operations in which the veins were wounded were done upon the neck, the shoulder, or the axilla. Most of them were for the removal of tumors in these situations. The introduction of air into a wounded vein, therefore, is liable to take place just in those situations *where the veins are emptied by the movements of inspira-*

tion. At a distance from the chest, this accident does not happen, because at that point there is no violent suction force exerted upon the vessel; and if there were, the walls of the vein would collapse beyond the wound, rather than allow the air to pass into its cavity. But if a vein be opened in the axilla, at the upper part of the chest, or in the lower part of the neck, then, at the movement of inspiration, when the blood is violently drawn toward the chest, the air is also drawn into the opening of the vein.

Amussat, who has written an extremely valuable memoir on this subject, insists particularly upon the fact that the introduction of air is liable to take place only in the region which I have mentioned; and he calls it, therefore, the "dangerous region." For, while the veins may be wounded with impunity elsewhere, the division in that neighborhood is always attended with serious risk.

But there are various circumstances which increase this risk, even in the "dangerous region" of the neck and shoulder. One of these is, anything that tends to *hold the vein open*, and thus to prevent the collapse of its walls. If the lips of the wounded vein be held apart by the blades of a forceps, air is much more likely to enter than if they were allowed to collapse. The history of the surgical accidents of this nature, which have occurred thus far, shows that this cause had a great deal to do with producing the result. In nearly all the recorded instances, the wounded vein was either surrounded by a tumor or adherent to its surface; and during the operation the tumor was forcibly lifted or drawn away from its bed, thus stretching the vein, and preventing its collapse. In Beauchêne's case, the introduction of air happened while the clavicle was being drawn outward, and the fibrous tissues about the vein thus put upon the stretch. This should always be regarded, therefore, as a dangerous proceeding, when veins are liable to be wounded in the operation.

If the parts about the vein be infiltrated with cancerous deposit, or by chronic inflammation, this would also render the accident more liable to happen; and might even extend the limits of the dangerous region to a considerable distance from the chest. Every one has observed, in dissecting a limb affected with chronic inflammation of the joint, for example, that the veins running through the infiltrated and hardened tissues have lost their power of collapse; and that they stand open, like arteries, after being divided. This is the condition known by the French as *canalization* of the veins. If such a condition of the parts were to extend upward from the limb, as far as the chest, the influence of inspiration on the veins might be felt throughout the entire intervening distance.

We must remember, furthermore, that air is drawn into the veins only by a forced and violent inspiration. No doubt, the accident is more likely to happen during an operation done without ether, than where a patient is under the influence of an anæsthetic; for while the respiration is calm and equable, the suction force exerted upon the veins, as we have seen, is easily compensated by the flow of blood from behind. But when a man is suffering pain, he is apt to take quick, forced, and sudden inspirations, and it is in such inspirations that air is most likely to be drawn into the vein, and thus become mingled with the blood.

Another circumstance that increases the danger of a fatal result, is an exhausted condition of the patient. From what I have already said, you will understand that the introduction of a small quantity of air into the veins does not necessarily produce death. It may be disposed of by solution, either at once or gradually. The threatening symptoms first produced may pass off, and the circulation return to its ordinary condition. I have often been surprised to see how much air may be blown into the veins of dogs or cats, without immediately causing death.

This has led to the belief, in some instances, that a small quantity of air in the veins was much more liable to be fatal in man, than in the lower animals. But it is the opinion of Amussat that the accident is much more apt to prove fatal when the patient is already exhausted by disease, or by the pain of a long operation. Then, a slight obstruction of the pulmonary circulation will be sufficient to cause death, while it might otherwise have been overcome, after a time, by the force of the heart's action.

At all events, there have been cases of recovery after the spontaneous introduction of air, even in the human subject. In one of Dr. Warren's patients, the most alarming symptoms continued for thirty minutes; but the patient nevertheless recovered, and the operation was afterward successfully finished. Other instances of recovery have occurred in the hands of Clémot, of Delaporte, of Amussat, of Dr. Mussey, and Dr. Mott. In a case which happened to Malgaigne, the patient recovered from the immediate effects of the accident, but died four days afterward, by an accumulation of frothy mucus in the bronchial tubes.

Now, in regard to the *symptoms* which accompany this accident, there is a great similarity between the different cases. At the moment when the air finds entrance into the vein, a peculiar noise is heard, like the passage of the wind through a small opening, or of air-

bubbles through a liquid. It is spoken of, by different observers, as a "hissing," "whistling," "lapping," or "gurgling" noise. In several instances, it has been compared to the sound of air entering a partially exhausted receiver. It has been mistaken, once or twice, for the passage of air into the pleural cavity; and in Beauchêne's case it was supposed, until after the autopsy, that the pleura had actually been opened. Sometimes the sound occurs but once; sometimes it is repeated at several short intervals, as the air is drawn in by successive inspirations.

At the same time with the occurrence of this sound, bubbles of air are often *seen* mixed with the blood in the wound, or regurgitating from the vein at the moment of expiration. In the case of M. Ulrich, frothy blood was discharged from the opening in the vein. In one of Dr. Warren's cases, bubbles of air appeared in the blood at the wound. M. Rigaud himself saw the air enter the vein and displace the liquid; and in Dr. Mussey's case, air-bubbles were also observed to pass into the vein. Most frequently, however, the air gains entrance too suddenly to be actually seen by the observer, and the hissing or gurgling sound is the only thing that attracts his notice.

It is curious, that the patient himself is almost always conscious that some terrible and threatening accident has occurred. He sometimes even feels that the trouble is located in the heart or in the vessels. In Beauchêne's case, the patient made a singularly striking exclamation. He cried out, as soon as the air had penetrated the vein, "*My blood is falling into my heart! I am a dead man.*" (Mon sang tombe dans mon cœur! Je suis mort.) In one of Dr. Warren's cases, the patient called out suddenly, "*I am sick!*" Delaporte's patient exclaimed, "*Ah! my windpipe is cut! I am lost!*" In the case of M. Amussat, the patient, who was a woman, survived the accident. She was afterward interrogated by the surgeon, as to whether the difficulty appeared to her like a fainting-fit. She replied "No;" that "in a fainting-fit, the trouble comes from above; but in that, the trouble came from below."

Very often, instead of saying anything, the patient utters a cry of distress, and becomes pale, insensible, and convulsed. There is frequently a similar cry, with convulsions, when air is blown into the veins of the lower animals.

It is unnecessary for me to say, gentlemen, that when air is introduced spontaneously into the veins, in this way, in surgical operations, it destroys life in precisely the same manner as when it is blown in artificially, for purposes of experiment. It passes to the right cavi-

ties of the heart, blocks up the vessels of the lungs, and stops the pulmonary circulation. It is accordingly found in the right auricle and ventricle, after death, and is seen also in greater or less abundance in the neighboring veins.

Furthermore, this accident may be followed by recovery, in the human subject, as well as in the lower animals. Amussat has collected, in his monograph, twelve cases in which death was not produced. In three of these instances, though the sound of air entering the vein was perfectly distinct, no injurious result followed, and the patient did not even know that he was in danger. In the other nine cases, however, the patient suffered for a time very alarming symptoms, which afterward passed off. No doubt the fatal result depends, in the human subject also, on the quantity of air introduced, and the exhausted condition of the patient.

It is plain, therefore, what ought to be done when air happens to have been introduced into a vein in a surgical operation. As soon as the sound is heard which indicates the passage of air, the opening in the vein should be at once closed by the finger of the operator, and the vessel secured by a ligature as soon as possible. For the danger does not cease with the first ingress of air; at any succeeding inspiration a new quantity may be drawn into the vein; and we have already seen that the risk of a fatal result is in direct proportion to the amount of air which gains access to the vascular system.

Attempts have occasionally been made to extract the air from the veins, after its admission, by introducing a syringe and withdrawing the piston; but the success attending these efforts has not been sufficient to encourage their repetition.

A few words, gentlemen, with regard to the *post-mortem appearances* in fatal cases of this sort, and the means of distinguishing them from others of a different nature. It is sometimes a matter of doubt whether a patient has perished from the introduction of air into the veins, or from some other cause. Now, how are we to determine this point?

In the first place, it is important to know that air may be introduced into the veins *after death*, and during the progress of the autopsy. You will hardly ever make a post-mortem examination of the head, for example, without finding air-bubbles in the superficial veins of the cerebral hemispheres. After sawing through the skull, you lift the calvaria forcibly upward, cutting or tearing away the attachments of the dura mater and the longitudinal sinus. It is at this moment that air is introduced into the longitudinal sinus and the

veins which open into it. It can afterward be seen in the vessels ramifying over the surface of the cerebral hemispheres.

The same thing often happens when you open the chest. While raising the sternum, you draw the air into the superior vena cava and the subclavian veins, through any opening which may have been made in them; and when the chest is fairly opened, you may see the air-bubbles, sometimes in considerable quantity, in the large veins in its interior. The mechanism of the introduction of the air, in both these cases, is the same as when it happens during life, viz., by the forcible lifting of a bony frame-work or inclosure, by which the air is sucked or drawn in from the exterior. It may be drawn into the abdominal veins, also, in the same way, if the manipulations used are such as to produce a similar effect.

How are we to know, therefore, when we find air in the veins in the interior of the body, whether it has been introduced during life, or accidentally gained admission after death?

You can determine this point by observing the physical condition of the air and of the blood. When air is drawn into the veins during an autopsy, it is present merely in the form of large bubbles—mostly in the superior and inferior vena cava, in the neighborhood of the heart. Even if drawn into the cavity of the heart itself, it presents the same appearance, having been mechanically introduced after the vital actions had ceased. But when it is introduced during life, while the circulation is going on, it is carried, as I have already told you, directly to the right cavities of the heart; and there, by the movements of the organ, it is whipped up into a bloody froth, or foam, consisting of minute air-bubbles, intimately mixed and entangled with the blood. *It is the presence of this bloody foam in the right cavities of the heart* which shows that the introduction of the air has taken place during life. This ultimate mixture of the air with the blood is caused only by the movements of the living organ; and there is no other appearance that can be considered as conclusive in regard to the nature of the accident.

There is one other cause, however, which may give rise to the appearance of air-bubbles in the blood after death. That is, the process of putrefaction. If the autopsy be delayed for some days after death, if the weather be warm and the body exposed, putrefactive gases may be developed in the blood, and may show themselves in the form of air-bubbles. But in such a case, the odor of decomposition in the body, as well as other marks of putrefactive change, would be sufficient to indicate the real nature of the appearances. To prevent all mistake,

however, it would be well, in doubtful cases, to collect the gases found in the blood and to analyze them, as was done by Roux and Delpech, in the instances which I have already mentioned.

A very ingenious rule is given by Amussat for distinguishing the gases produced by putrefaction, from air which has been introduced into the heart during life. When the heart is distended, he says, with air introduced during life, the cadaveric rigidity of the cardiac fibres comes on afterward; and then, even if you allow the confined air to escape, the organ still preserves its expanded form. But the distention of the heart by putrefactive gases is accompanied with a relaxed condition of its fibres, and on puncturing it, the organ immediately collapses, owing to the flaccid condition of its muscular parietes.

In conclusion, gentlemen, I have to mention to you one very curious way in which the introduction of air into the vessels has been thought to take place; that is, *by the veins of the uterus after parturition.*

In Amussat's monograph on this subject, a number of cases are mentioned, in which sudden death occurred in young females, after delivery, without any apparent cause; and the author expresses his conviction that, in some of them at least, the death was owing to the introduction of air into the uterine veins. A similar instance is quoted by Milne Edwards, in his book on Physiology, from Lionet. Dr. J. R. Cormack wrote a paper on the same subject, in 1850, which was published in the Edinburgh *Monthly Journal of Medical Science*, for that year. Dr. Cormack maintains the possibility of air entering the uterine veins after delivery, and quotes cases from Dr. Meigs, Dr. Lever, and Dr. Simpson, to show that it has occasionally happened. Dr. Simpson explains it by supposing that the uterus itself, by alternately relaxing and contracting, *forces* the air into the open mouths of its own vessels.

But, on looking over the whole history of this subject, I must acknowledge that it appears exceedingly doubtful whether such an accident ever actually happened in the human subject. I am not aware that there is a single case on record in which the evidence was conclusive. In most of the cases there was, at the same time, more or less hæmorrhage, to which the death might be attributed. In many of them there was no post-mortem examination. In some, air was found in the veins of the uterus and abdomen; but in none of them was the frothy mixture of blood and air found in the right cavities of the heart, which can alone show conclusively that the introduction of the air took place during life. On the whole, therefore, it is very uncertain

whether such a spontaneous introduction of air, after delivery, has ever been the cause of death in the human female.

A very remarkable case, however, occurred at Albany, in this State, a few months ago, in which it seems certain that air was really introduced into the uterine veins, though by a very different mechanism from that suggested by Dr. Simpson. The case happened under the observation of Dr. John Swinburne, who published an account of it in the Philadelphia *Medical and Surgical Reporter*, for April 23d, 1859. The patient in this instance was an unmarried woman, who was residing at the house of an abortionist, (also a female,) for the purpose of having a miscarriage induced. An attempt was made to rupture the membranes, by introducing into the uterus a gutta-percha catheter; and, according to the account given by the woman, no sooner was it introduced into the uterus, than the patient fell back, as she supposed, in a fainting-fit. Finding that the fainting-fit did not pass off, the woman became alarmed and sent for a doctor, who immediately repaired to the house and found that the patient was dead.

Dr. Swinburne, next day, made an examination of the body, and found that the sinuses of the uterus, the jugular veins, and even the superficial veins of the body, contained air. The right cavities of the heart were "distended with a spumous mixture of blood and air." The uterus contained a healthy, five-months fœtus. The membranes were unbroken, but were separated from the uterine wall externally, on the right side, together with a portion of the placenta; and there was a perforation at this spot, leading into the uterine sinuses, about two inches distant from the cervix.

The air found in these vessels could not have been the result of decomposition, since the affair happened in the month of March, and the autopsy was made fourteen hours after death.

Dr. S. expresses the opinion, and, I think, correctly, that in this case the air was forcibly *blown in* through the catheter, with the intention of producing separation of the membranes. The membranes being partially separated in this way, and the uterine veins passing to the placenta, being opened, but not quite torn across, air might readily be forced into the veins by insufflation, and might so produce instantaneous death. Or, the end of the instrument may have penetrated one of the uterine sinuses, and thus may have introduced the air directly into the vascular system.

Lectures on Displacements of the Uterus. By E. R. PEASLEE, M.D., LL.D., Prof. of Obstetrics and Diseases of Women and Children in the New York Medical College.

(Continued from last No. of the MONTHLY.)

LECTURE IV.

GENTLEMEN—To-day I have to speak of the symptoms, the diagnosis, and the treatment of prolapsus uteri.

It is an important practical fact that the first degree of prolapsus is often productive of far more suffering than the third even. Sometimes the malaise is very great during the first degree, but mainly subsides when the second is attained, since the cervix then rests on the perineum, and the strain is taken off the uterine ligaments. Much, however, depends on the social condition of patients affected by this displacement. The lower classes suffer far less from the same degree of descent.

There are few, if any, of the rational symptoms which are distinctive of prolapsus; the physical signs alone being conclusive. And many patients who have not the least degree of prolapsus infer very positively from their sensations that they have this displacement, and their medical adviser may be equally deceived till an internal examination is made. I shall, therefore, pass rapidly over the rational signs of this displacement.

It is, of course, desirable to detect the existence of prolapsus while still in the incipient or first degree. There is reason to believe that this stage often exists a long time, causing great suffering meanwhile; but remains undetected, because the patient does not suspect the cause, and specify the early symptoms. But it is while in this state that prolapsus is most promptly and certainly cured; and when it has become complete, (3d stage) the patient herself has already made out her own case. I shall, therefore, speak more particularly of the rational symptoms of the first and second stages.

1. The most *characteristic* rational symptom of the first stages of prolapsus, is found in the fact that the unpleasant pelvic sensations are usually at once removed, or at least much relieved, when the patient lies down; again to return when she rises, and to be increased by standing or walking.

I shall also specify the most prominent of the rational symptoms produced by this displacement, and refer you for the sympathetic or indirect symptoms, common to this and the other classes of displacements, to the preceding lecture. I should, however, premise that the functions of the uterus are usually not essentially deranged in the first two degrees of prolapsus. Leucorrhœa, perhaps, always exists; but men-

struation generally continues regular, and does not become either decidedly painful or menorrhagic. Conception also occurs in these two stages of prolapsus, and sometimes even in the third degree. Churchill quotes a case of even irreducible prolapse in which pregnancy occurred. On the other hand, either degree of prolapse may become the cause of sterility.

Referring to my first lecture for the direct rational symptoms common to the various uterine displacements, I call particular attention here to the following as being most frequently met with in the first degrees of prolapsus. A "bearing-down" sensation, a sense of dragging from the umbilicus, (from tension of the urachus,) or from the loins; a feeling of weight in the anus, increased while standing, and usually ascribed by the patient to piles; pain in the back, extending to the groins; irritation of the bladder and difficult or frequent micturition; and rectal tenesmus.

Very rarely an acute sensibility of the whole surface of the abdomen, simulating peritonitis, occurs in the first stage of prolapsus; and which disappears as soon as the displacement is rectified. Dr. Meigs has seen thirty cases of this kind.

In the third degree of prolapse there is difficulty in micturition and defecation. Sometimes neither of these acts can be effected till the patient lies down, and returns the protruded mass. Retention of the urine, necessitating the use of the catheter, is a common symptom in irreducible cases.

2. A *vaginal* examination should be made in all doubtful cases, while the patient is standing. Cases indeed occur in which the rational symptoms clearly point to prolapsus, but in which not the least descent of the womb can be certainly ascertained, even while the patient is in the erect position. But on raising the womb slightly on the tip of the finger all these symptoms disappear at once, to return again the instant the support is withdrawn.

In the *first* degree of prolapsus—exclusive of the class of cases just alluded to—the vaginal exploration shows the os uteri to be too low in the vagina, and usually in contact with its posterior wall. In the *second* degree the os rests on the perineum, or even presents between the labia; the fundus being now retroverted, as already explained, (Lect. 3d, p. 433.) In both these degrees, pressure applied in the proper direction usually at once restores the uterus to its normal position.

In the *third* degree, or complete prolapsus, the external tumor is somewhat sensitive, firm, and usually fluctuating anteriorly; being six

to ten inches long, and sometimes hanging half way down the thighs. It is sometimes of an oval or globular form, but is usually conical, the uterus forming its apex below, while its base fills the os externum above, and the labia extend along its sides. In cases of long standing, however, the lower extremity of the tumor becomes the largest. But even when the extruded mass attains to its largest size, the uterus itself may not be at all enlarged. The os uteri is, of course, *always found at the lower extremity of the tumor*, presenting a rounded or semilunar form, or being sometimes so contracted that a pin will scarcely enter it, (Bochmer.) There is, except during the menstrual period, a constant, and often very abundant, flow from it of mucus, or of pus; and the surface of the tumor, at first presenting the natural color of the mucous membrane, soon becomes dark red, or brown, and is inflamed or ulcerated, or even incrusted with saline deposits. Finally, however, the membrane may become dry, and more and more resemble the skin. The cervix uteri also sometimes becomes very much elongated.

Diagnosis of Prolapsus.—There are no rational signs which will certainly distinguish the first two degrees of prolapsus from the other classes of uterine displacements, as we have seen. Usually, however, the feeling of weight in the anus, and of pressure on the bladder, and the strangury, are at once relieved on lying down; which is not the case in anterior and posterior displacements. But the vaginal exploration is conclusive.

Elongation of the cervix has been mistaken for the *first two degrees* of prolapsus; but in that condition the vagina still retains its normal length and firmness. This is the fact also in cases of polypus uteri, partial inversion of that organ, and tumors in the pelvis—all of which have been mistaken for prolapsus. Besides, in these affections the os uteri is not to be felt at the lower extremity of the tumor; and in partial inversion we have the characteristic repeated floodings.

The *third* degree of prolapsus may be mistaken for polypus uteri, complete inversion of that organ, and prolapse of the vagina.

But polypus is not sensitive, has nothing corresponding to the os uteri at its lower extremity, is not reducible, and presents no fluctuation anteriorly, as is the case with reducible prolapse. Moreover, the vagina is not shortened in case of polypus. Sometimes a fissure exists at the lower end of a polypus; but this is easily distinguished from the os uteri by the attempt to pass a probe.

Complete inversion is known by the repeated floodings, the constitutional disturbance, and the absence of the os uteri at the lower extremity of the tumor.

Prolapse of the vagina is a less solid tumor than prolapsus uteri; and here again the os uteri is absent.

Effects of Prolapsus, and its Terminations.—If no treatment is resorted to, the first and second degrees of prolapse finally lead to so many sympathetic affections, as explained in the preceding lecture, in addition to the local suffering and the exhausting leucorrhœal discharge, that the health becomes completely deranged, and the patient succumbs; or she may perish in consequence of an inflammation excited by the malposition of the organs within the pelvis.

The third degree of prolapsus may prove fatal from the constitutional irritation consequent on the ulceration of, and the discharge from the extruded mass, or from retention of urine—and especially if it be irreducible.

A fatal termination of prolapsus is, however, quite uncommon. The patient most frequently drags on a miserable existence till carried off by some other disease. Gangrene may occur in complete prolapsus, and the whole uterus slough away, and the patient still recover. And women who suffer constantly from a complete prolapsus, so long as they continue to menstruate, and have, perhaps, been bedridden for years, sometimes experience only an inconvenience from this displacement after menstruation finally ceases, and again find themselves able to stand and walk without much difficulty.

It should also be added that prolapsus of the first two degrees is generally entirely relieved by pregnancy, after the fourth month has passed. The same may also be the case with complete prolapsus, if it remain reducible. And in all cases we may expect that the recurrence of prolapse after parturition may be prevented by judicious management. The occurrence of pregnancy is quite probable so long as even complete prolapse is reducible, and it is possible though the displacement be irreducible; but in the first and second degrees, conception is sometimes prevented by the close contact of the os uteri with the vaginal wall, and hence sterility is an effect of this displacement, as before noted.

If pregnancy continue through the fourth month, it is likely to go on to the full term. This has, indeed, occurred in a case of prolapsus which was irreducible from the period of conception till after parturition had taken place.

Complications of Prolapsus.—The prolapsed uterus remaining in a state of hyperæmia, sometimes becomes hypertrophied to twice its normal size; or the cervix may become elongated to twice its normal length. In complete prolapsus, the bladder and rectum may come

into contact above the extruded uterus, and adhesions between them, or between the uterus and contiguous parts, may form;* in which case the prolapsus becomes of course irreducible.

Prolapsus may also be complicated with any of its direct causes, (intra- or extra-uterine tumors, inflammation, &c., &c.,) specified in the preceding lecture; and some of these may render it irreducible and incurable. It is also frequently attended by ovaritis; and which requires the treatment appropriate to it in other conditions.

Pregnancy is a not uncommon complication of prolapse, and there is no very great tendency in these cases to miscarriage after the fourth month is passed, as has been already said. The prolapsed uterus can usually be reduced up to the fourth month; and in one instance Giroud effected the reduction but six days before delivery. In some instances, however, the uterus cannot be reduced after the first month of pregnancy.

Prognosis of Prolapsus.—We may expect to afford great relief in all cases of prolapsus; and, as a general rule, if we can make the circumstances of the patient accord with our directions, we may expect a complete cure. The prognosis of uncomplicated prolapsus may be more positively expressed in a favorable manner, than that of any other uterine displacement; and, perhaps, no case should, in the most favorable circumstances, be pronounced incurable. The most unpromising and obstinate forms of irreducible prolapsus have yielded to persevering treatment.

In married patients, however, of the lower classes, circumstances very often interfere with an entire recovery, unless pregnancy supervenes.

In case of complications with prolapsus, the prognosis is of course based on the probability of removing such complications, or of neutralizing their agency in producing or perpetuating the uterine displacement.

Treatment of Prolapsus.—Prolapsus accidentally discovered, and producing no symptoms—for such cases occur—requires no treatment. But in all cases of moment, local treatment is required; and in those of long standing, general and moral treatment is also necessary.

I. The *local* treatment is of the first importance in all cases, as has already been shown (Lect. 3d, p. 427) the indications being:

1. To remove the cause, if possible, of the displacement;
2. To replace the uterus;

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*Baillie, Morb. Anat. 4th Ed. p. 419.

3. To maintain it in position by appropriate mechanical appliances, if the natural supports are not sufficient, or until they are sufficient, to maintain it. Cases occur in which the relaxation of the vagina may be overcome in part or entirely by the use of astringent injections by the patient herself, after the uterus is replaced; and in all cases if there be no inflammation or congestion of the latter, the reposition should be at once effected, and then the applications required to retain it *in situ* should be made.

1. The removable causes of prolapsus are (Lect. 3, p. 435,): congestion (or inflammation), hypertrophy, polypus, and arrested involution of the uterus itself; and ascites and ovarian dropsy. And, as a general rule, either of these should be removed before the uterus is replaced. There would also be but very few exceptions to it in the case of accompanying polypus and the two forms of dropsy; but in the case of congestion, inflammation, hypertrophy, or arrested involution, the treatment instituted to remove these conditions will often be more promptly effectual if the uterus is first replaced, and retained *in situ*, so far as a recumbent position will accomplish this; but no *pessary* can be used, as we have seen, while there is congestion or inflammation (Lect. 2, p. 257.)

I shall not here speak of the methods of removing uterine polypi, and dropsy, either ovarian or abdominal, as I have discussed these topics in another connection. The most common complications are, congestion or inflammation of the cervix, or of the entire uterus, and hypertrophy of the cervix. Nor will I here dwell upon the treatment of these conditions. You remember congestion and inflammation are treated mainly by rest in the recumbent position, leeches to, or free scarifications of, the cervix, saline laxatives, vaginal injections of cold flaxseed or slippery elm infusions, several times daily; the hip bath at night, with an appropriate regimen; while hypertrophy is removed by the tinct. Iodine, the potassa cum calce, the acid nitrate of mercury, or the actual cautery.

In chronic cases, however, in which the general health is already failing, it is a matter of the utmost importance to avoid confining the patient to her apartment, or, indeed, within doors, if this can possibly be avoided. In such cases, therefore, you may return the uterus from time to time, while resorting to the above-mentioned means, and keep it in place for a few hours by a medicated pessary, while the patient sits up, or even rides out, if this be expedient. A mass of lint or cotton, of the size, when pretty firmly compressed, of a hen's egg, or larger, completely saturated with a mucilage of gum-Arabic

(or flaxseed infusion,) have been found to answer this purpose well. And while the treatment for the removal of hypertrophy of the cervix is being employed, we may often introduce a pessary and allow the patient to walk about, without retarding the cure.

If ulceration coexist with prolapsus, it may also receive attention after the congestion is removed and the uterus replaced; the application of the nit. Argenti once in six or seven days usually being all the treatment required for its removal. Ulceration will, however, often at once disappear after the malposition is removed, and treatment promises nothing so long as congestion or inflammation persists.

2. Having fulfilled the first indication of the treatment, we may proceed to replace the uterus. In the first and second degrees of prolapsus this is usually at once accomplished by the pressure of the tip of the index finger, carried in the proper direction, while the patient lies upon the back.

In some cases, however, the uterus, falling down about one-half the length of the vagina, becomes fixed to such an extent, that no slight or safe amount of pressure can dislodge it; or, in other words, the prolapse becomes practically irreducible. In such a case, the globe pessary, of a proper size, may be found of great value. If there be space for the introduction of a little more than one-half of the instrument, the constant action of the sphincter vaginæ upon the portion which at first protrudes between the labia, will gradually carry the instrument into the vagina, and the uterus upward, before it, to its normal position. Of course, the patient is to maintain the horizontal position after the instrument is applied, and avoid every effort; and from one to three days may be required to accomplish the complete replacement. Dr. Meigs mentions a case which was relieved in this way within 24 hours, by a globe pessary 1¼ inch in diameter.*

In cases of the *third* degree of prolapsus, the uterus can usually be returned to its normal position in the following manner: the patient lying on the back with the pelvis elevated, apply pressure with the thumb and finger (previously well oiled) to the lowest and central part of the mass, (the cervix uteri,) and endeavor to carry this portion upward in the direction of the axis of the whole mass. The patient must, of course, avoid making any effort during the reposition, and after it is effected, and must still retain the horizontal position. If the tumor is swollen and tender, leeching, and perhaps bloodletting

* Woman and her Diseases, p. 203.

also, or deep incisions, may be necessitated before reduction is attempted. Sometimes the continual pressure of a bandage has been used with final success. Reposition has been in some cases effected by judicious management, after the mass has remained in an irreducible state for years; and we should never despair, in an uncomplicated case, of final success. If there be calculi in the bladder, they should be removed before the reduction is attempted.

Sometimes great distress is produced by the reposition of the uterus. If this continue, under the influence of appropriate anodynes, the mass should be allowed again to extrude and the reduction be deferred to another time. Adhesions existing, may, on reduction of the mass, expose the patient to all the dangers of strangulated hernia.

3. We now come to the third indication of the local treatment, viz., the application of a proper mechanical support to retain the uterus in place. We often meet with cases in which the uterus remains in place after the removal of the cause of the descent, as explained under the first indication, without the aid of any mechanical support. Or an astringent medicated pessary worn for a few days, may be all that is required—as a mass of lint or cotton wet in a solution of tannin (ʒj to aquæ fʒvi.) In cases where there is merely relaxation of the vagina, without any tenderness or congestion of either that canal or the uterus, I have often effected a cure in a few weeks by the application once in 4 to 6 days, through the speculum, of one-half teaspoonful of tannic acid, and then a mass of dry cotton large enough to somewhat distend the vagina, and which remains there till removed for the next application. The cold hip bath at night is also useful in these cases. Meantime the patient walks or rides out daily.

But in most cases of long-standing prolapsus, a mechanical support is constantly required for several weeks or months; and hence a pessary becomes the appropriate instrument. I have specified the conditions in which pessaries may be applied, and have given the rules for their management in the second lecture (p. 257); and will not here repeat them. I have also there given my reasons for preferring the steel spring covered with gutta percha, or the spring of pure tin, in almost all cases of prolapsus.

The introduction of the pessary is effected with the greatest facility while the patient lies on the back; and the steel spring covered with gutta percha is introduced with the least pain, and usually produces the least subsequent irritation.

I shall not, therefore, be understood by any means to recommend a

pessary in every case of prolapsus. I agree with Dr. West* that a pessary may be neither necessary nor suitable—

1. In slight cases of prolapsus.

2. When the descent, still comparatively recent, is due to the persistence of the puerperal state of hypertrophy (or arrested involution after parturition.)

3. When uterine disease of whatever kind was the cause of the displacement, and still demands treatment.

4. I also add that we must hesitate to use a pessary in case of a pregnant patient, lest it induce a miscarriage.

If for any reason a pessary cannot be borne, and the patient must still be standing and walking daily, the pressure of a pad upon the perineum by means of an appropriate bandage, as recommended by Dr. Hamilton, may secure great relief as a palliative measure for the time being.

After the pessary is applied, the patient should use an astringent vaginal injection at night (alum ʒj to ʒiv, or tannic acid ʒj to ʒij, to water Oj;) and an injection of water at the temperature of her apartment, in the morning. Some of the other astringents mentioned in the second lecture may be substituted for these; but if there be heat or tenderness of the vagina or of the cervix uteri, the acetate of lead, (ʒj to ʒij, to water, or mucilage Oj,) is preferable, I think, to all the rest.

The pessary should be removed once in two weeks or less, in order to examine and cleanse it, and whenever a smaller one will answer instead, it is to be substituted. In cases of complete prolapsus, an instrument three inches in diameter, and very strong, is usually at first required.

On removing a pessary, the patient should be made aware that she will, for a time, feel a need of its support; this sensation being generally complained of on its removal, whether the instrument is longer required or not.

How long should a pessary be worn, is a question not easily answered in definite terms. Several months at least, in chronic cases, and especially if the patient is past the meridian of life, and has had several children. We can know when it can be dispensed with, only on ascertaining the effects of its removal for a day or two. Pessaries have been found beneficial, and indispensable, for years in succession; but we may hope to diminish such instances to a very small number by judicious treatment, except when some incurable complication coexists.

* Lectures on Diseases of Women.

On discontinuing the use of the ring pessary, a small astringent medicated pessary, as before described, or a little muslin bag (a sachet,) filled with tannic acid, or powdered nutgalls, may be used for a time instead. These last can be introduced at night, and also removed in the morning, by the patient herself; if a thread be attached to the sachet previously to its introduction. Astringent vaginal suppositories also, are a good substitute for the sachet just described, for which, the following formula answers well—or the butter of cocoa may be combined with the astringent substance:

R.—Tannic acid, ℈iiss., or alum, ʒij, or acetat. lead, ʒss.
Ceræ albæ, ʒij.
Axungiæ, ʒvi.

Mix—make iv. suppositories. One to be applied every second or third night.

Such is the local treatment of the three degrees of prolapsus uteri. Certain modifications are, however, required by certain complications. If, in the cases of complete prolapsus, the uterus becomes too heavy from a tumor in its own substance, or is so pressed downward by an extra-uterine tumor, that the pessary I have recommended is not sufficient to sustain it in place, a stem pessary must be used instead. It is in this class of cases that the peculiar value of this form of pessary becomes apparent; and to this class I would restrict its use. In cases of the first and second degrees of prolapsus, complicated with rupture of the perineum, the globe pessary is usually found to be preferable to any other form.

Finally, several operative methods have been proposed to effect the radical cure of reducible prolapsus, which has resisted treatment long applied. I here merely allude to the operation for contracting, and that for entirely closing the vagina, and refer you to the proper authorities for the manner in which they are performed.*

II. The *general* treatment of prolapsus uteri will, of course, depend on the precise condition of each patient. If all the functions are still in a normal state, as is often the fact in recent cases, no medication at all is required.

Generally, however, the digestion is more or less deranged before the patient applies for aid. Constipation exists in almost all cases; and saline laxatives, if there be any heat or tenderness of the parts, or rhubarb and soda, or some other mild aperient, if there is no such symptom, may be required. This symptom removed, the bitter tonics are

* See Churchill on Diseases of Women, p. 362, and 366–8.

generally indicated; and iron also, if there be anæmia. You have observed how frequently I have felt it necessary to prescribe the various preparations of iron in this class of cases. Bland, but the most nutritious diet, is also required; and much riding also, with but very little walking. Regular sleep must be secured by the use of valerian or lactucarium at night; or of some other soporific of the same class with them, rather than of opiates. But I can only indicate the general principles under this head, since the peculiarities of each case will suggest its general management.

III. I must add a word in regard to the *moral* treatment of this affection. Your sympathy for the patient, as indicated by your kindness and delicacy of manner, will often accomplish far more than your general treatment; and the hope you inspire by your candid expression of your expectation to relieve, or to cure, is the most efficient of all tonics. Such patients are usually despondent, and the physician should, if possible, keep them cheerful by suggesting appropriate occupation and amusements; and while he sets an example of kindness and sympathy, he should inculcate the same upon the friends of the patient with whom she is in constant relation. Especially should the husband, if the patient has a husband, be made to understand the nature of the case, and why his wife is changed in spirits, and perhaps in temper also, as she is. A husband's sympathy is often, in such cases, worth more to the patient than all the medication; and the latter is often rendered entirely useless by a want of it. Doubtless you will sometimes be tried by the caprices, the irritability, and even the perverseness of such patients, especially if they have been much indulged; and will be obliged, at times, to manifest no little decision. This is, however, not inconsistent with the kindness I have inculcated; and when, at last, the cure is accomplished, you will find yourself fully compensated by a woman's gratitude, and which is never more deep, sincere and lasting, than when it is based on the successful results of professional skill in combination with such conduct as I have suggested.

On Coryza Maligna. By BERNARD KELLY, M.D., Physician to the New York Dispensary.

J. C., at seven months, was attacked on the 13th of April last with coryza maligna. I saw the child on the following day, and consequently had ample opportunity to observe the peculiar phenomena of the disease almost from its origin to its fatal termination. The symptoms simulated those of ordinary nasal catarrh, but were marked by a

greater intensity. There was an abundant discharge of a glairy mucus from the nostrils; the conjunctivæ were injected; the face and neck sensibly swollen; the temperature of the skin was very little, if any, above the natural standard; a gentle perspiration covered the whole body; the bowels showed a slight tendency to constipation. The little patient nursed with a great deal of difficulty and distress, being obliged to relinquish the nipple every two or three seconds in order to catch breath. He was by no means fretful, as one might, at first sight, expect from the excessive gravity of the case, but, on the contrary, lay, for the most part of the time, in a torpid, drowsy condition, from which he was only aroused by the assiduous attentions of his nurse, or when excited by the cravings of hunger. There was a constant exacerbation of all the symptoms towards night.

Severe, unquestionably, as the latter were, I did not venture to have recourse to decided antiphlogistic measures. I calculated on the disease persisting a considerable time, and consequently deemed it more judicious to foster the strength of the little sufferer, in order to conduct him safely, if possible, through the terrible ordeal which awaited him. I ordered a quarter of a grain of quinine to be given every three hours, with a powder composed of *hydrarg. cum creta*, and rhubarb, at bedtime, in sufficient proportions to relax the bowels gently. This treatment was persevered in for three days with every hope of encouragement, when the symptoms suddenly redoubled in severity. It was now deemed advisable to call a consultation, and accordingly a physician of great experience and judgment was sent for, who concurred in the treatment, and suggested the propriety of a warm bath that night. It was given, and the following morning the child was covered with a profuse eruption of measles. It may be well to remark here, that there was no cough, nor any physical sign of bronchitis or pulmonary congestion previous to, or following the appearance of the exanthem. The breathing was natural in every respect, save that it was performed entirely through the mouth, which was thereby parched, and needed frequent wetting. The catarrhal symptoms abated not a particle in their intensity; the general condition of the patient, however, was not materially worse. His food consisted principally of arrow-root and beef-tea, which he used with no inconsiderable relish. Towards the eighth day from the first attack, the eruption began to decline, and the discharge from the nares to grow less consistent, but scarcely less profuse. He again sought the breast with great avidity (for several days had now elapsed since he was capable of nursing,) and bore the spoon-feeding with evident reluctance. His attempts, however, were

not more successful than those mentioned in the early stage of the disease, and precisely for the same reason. The bowels now became excessively relaxed, without any apparent cause, and the strength of the child was sinking rapidly. Small doses of *Tr. opii camph.* were given with the quinine, but were obliged to be suspended from the fact of nausea and vomiting being induced. The alvine discharges became less frequent and watery; they were, however, exceedingly fœtid—a character which even the breath and cutaneous exhalation partook of to a certain degree.

Matters continued in this precarious state till about the fourteenth day, when all the symptoms of membranous croup suddenly manifested themselves. The respiration became hurried and stridulous; while ever and anon the *brazen cough* rang upon the ear with an ill-boding sound. No febrile excitement supervened; on the contrary, the temperature of the surface (which was now of a sallow, dingy hue) was very sensibly diminished. All the animal heat of the patient seemed to concentrate itself in the soles of the feet and palms of the hands. On examining the fauces attentively, the whole soft palate and tonsils were found covered with a yellowish-white false membrane; the nares were lined by a similar deposit. The disease had marched so rapidly (as shown by urgent *dyspnœa* and coldness of the body) that I utterly despaired of all topical medication. The chlorate of potash was now given with the view of arresting the further exudation of lymph and oxydizing the blood; while the patient's strength was sought to be supported, in the mean time, by aromatic spirits of ammonia and burnt brandy. All these means proved completely inadequate; for he sank steadily, and died in twenty-four hours from the first manifestation of the croupal symptoms. There were no convulsions from the beginning to the close of the disease. The child preserved throughout his natural intelligence, which, I may remark, was unusually precocious.

Were I to express an opinion candidly upon the pathology of *coryza maligna*, I would unhesitatingly place it in the same category with scarlatina, erysipelas, diphtherite, and *à fortiori* with croup. The same depression of the vital powers, the same blood-poisoning, I might add, seem to be at the source of all, and to constitute their most prominent morbid characters. I should, therefore, were I to meet another case similar to the one under consideration, begin from the very outset (so as to crush it in the bud) with free doses of quinine and tincture of iron, either in combination and simultaneously, or separately and in alternating intervals, as its peculiarity or emergency might require. The tender age of the patient should present no obstacle to

a bold trial of this treatment. For there is very little difference (as far as the life of the subject is concerned) whether we calmly look on with folded arms, as it were, and allow the disease to march to a fatal termination, or that we arrive at the same end through the activity of our remedies; such, at least, are my present convictions; further observations may lead to more important developments.

The most reliable topical applications would, undoubtedly, be the sulphate of alum and nitrate of silver; yet, if the disease consists in some fundamental change (as I believe it does) in the physiological constitution of the blood, it is not very easy to comprehend how local means can be of any decided benefit, while the *materies morbi* lies so far beyond their reach, and thereby remains intact. The physician, now-a-days, would be rationally deemed behind his age, who would rely upon topical applications solely in the treatment of erysipelas or scarlatina; and, reasoning from analogy, there cannot be the slightest doubt but that the same rule would apply equally appropriate in the case of coryza maligna. All that may well be expected from injections of alum or nitrate of silver is an arrest of further exudation of lymph, or its destruction, if already effused, in the parts with which they come in contact, and thus become auxiliary to the constitutional treatment; but the mucous membrane of the larynx, trachea, and bronchial tubes yet remains, to furnish a large surface for the fatal scope of the disease, and will, consequently, circumscribe the salutary action of local applications within very narrow limits.

Report of the Committee of the Medical Society of the State of New York on Pharmaceutical Preparations.

The committee to whom certain pharmaceutical preparations were referred, beg leave to report, that these preparations were fluid extracts, so called, presented by Messrs. Tilden & Co., and specimens of sugar-coated pills and boluses, presented by Mr. Reichard, agent for the manufacturers, Messrs. Garnier, Lamoureux & Co., of Paris.

The discussion, which arose upon the motion to appoint this committee, seemed to indicate a desire on the part of the Society for a general inquiry into the value of these comparatively new preparations, and this report will, therefore, take a somewhat wider range than a strict construction of the resolution which calls it forth, might warrant. Your committee are, however, quite confident that no serious objection to this course will be raised.

Almost immediately after the adjournment of the Society, a circular was prepared, setting forth the purposes of the committee, and accompanied by a series of questions, to which answers were desired. A copy of the circular is annexed to this report.

The inquiries were divided under four heads, viz.: A, of fluid extracts; B, of solid extracts; C, of active principles; D, of sugar-coated pills; and it will be best for the divisions of this report to follow the same order.

A, of Fluid Extracts.

From the answers to the inquiries of your committee, concerning fluid extracts, it appears that this class of preparations are chiefly furnished to the profession in this State, by Tilden & Co., and by Thayer & Co., but it is not quite clear to which the preference is given. Some speak very decidedly in favor of Thayer's, and assign their reasons very distinctly. The majority, perhaps, of those who appear to have given a thorough trial to both manufacturers, seem to prefer Thayer's, but they are a minority of those who have replied to the inquiries of the committee. Your committee have used both preparations, and there seem to be grounds for preferring Thayer's. Usually the dose is smaller, and the extract has more the appearance of an ordinary tincture. The Tildens' preparations are usually more syrupy in their consistence. On this point your committee would not speak very decidedly, but are quite certain that they ought, in alluding to the subject, to commend a careful comparison of the preparations of both manufacturers to the profession. Such a comparison will probably result in a decided preference being given to certain preparations of one manufacture, and to certain others of the other. A few of the correspondents of the committee speak favorably of the fluid extracts of Keith & Co. These do not appear to be much known to the profession generally. The only one of this manufacture which has been used by your committee, is veratrum viride, and has been so concentrated as to require extreme caution in its use.

As a general rule, practitioners obtain their preparations from druggists, and not directly from the manufacturers. It is noticeable that those who obtain them directly from the manufacturers, speak with more decision of their excellence than others. This may be from their supplies being fresher.

It is very clear that "the strength or value of preparations of the same drug from the same maker," is not constant. Some of the correspondents of your committee complain very much of this inequality; while it is no doubt owing to this fact, that such different opinions are expressed concerning the extracts of the same drug. Thus some cor-

respondents appear to place perfect dependence upon the fluid extract of *veratrum viride*, while others say decidedly that it is entirely worthless. Careful observers find that different samples do differ in their strength; and this fact ought to be distinctly understood. The inevitable variations in the valuable qualities of the plant or other crude drug from which the fluid extracts are prepared, make it imperative on the part of the manufacturer to use every care in the selection of his materials, while the difficulty of detecting these variations makes it doubtful if this difference in the extracts can be entirely avoided. Each new package should, therefore, be carefully tested by the physician when he commences to use it. From this fact it is evident that the fluid extracts of the more active drugs are not so well adapted to the use of the simple prescriber in city practice, as to that of the practitioner who dispenses his own medicines.

The testimony is uniform that in this State the fluid extracts keep very well. In some of the Southern States complaint is made that they ferment.

As to the deposit of sediment, it is not generally noticed to exist in large amount. The chairman of your committee found, in examining thirty-six different extracts of Tildens' manufacture, as they stand in a druggist's shop, that ten of them had no deposit at all; in eight it was slight; in three it was very abundant, sometimes amounting to a quarter of the contents of the bottle, and of a honey-like consistence; and in the remaining preparations the deposit, though not so profuse, was quite marked. Taraxacum seems to be especially apt to deposit a sediment. Professor William Procter, Jr., of Philadelphia, the able editor of the *Pharmaceutical Journal*, in the answers which he kindly made to the inquiries of the committee, says that nearly all of these preparations do deposit a sediment, "but not necessarily to their injury." In such large quantity, however, as some of these specimens gave, it must be injurious.

Comparing fluid extracts with tinctures, some of our correspondents prefer one form, and some the other, the parties being almost equally divided, and both speaking very decidedly. A portion are in doubt. Where they are in favor of using the extracts in preference to the tinctures, the reasons assigned are greater uniformity, smaller dose, less taste, and the smaller quantity of alcohol. Your committee doubt if these advantages are not more imaginary than real, and would place fluid extracts and tinctures *carefully made*, on the same footing. Especially is this true of the preparations of the more potent drugs, as aconite and veratrum viride. The latter is spoken of by the corre-

spondents of your committee, with especial frequency, and has perhaps been most commonly used of all the fluid extracts. As compared with Norwood's tincture, it possesses no advantage as to dose, and in that the portion of alcohol is quite small.

So, too, it is with the tinctures of more common use, as, for instance, of rhubarb. The dose of the extract has to be about, if not quite, as large as that of the tincture; its taste is no pleasanter; its action in no way preferable. In fact, your committee would place them upon precisely the same level with good tinctures, carefully made from the best quality of drugs.

It is curious to observe that there is the most varying estimate of the value of the different extracts, by the different correspondents. One gentleman finds everything made by the Tildens to be perfectly reliable, while others find those made by the same firm to be as entirely unreliable. The truth we suppose to be between these extremes. But there is one fact that may account for a portion of this variation of opinion. Ergot is spoken of most uniformly as inert, or nearly so; the enthusiastic correspondent just quoted, admitting that it is "as variable as any." Cotton root stands in the same class, and is spoken of in the same way. Admitting that the cotton root has the action upon the uterus, which is attributed to it, may it not be a fair conclusion that these extracts have been thought to be inert, because they have been administered when they were not indicated? It is far from being true that ergot will produce uterine contractions under all circumstances, and the inappropriate use of the drug ought not to be allowed to affect our opinion of its potency.

In the hands of your committee, the Fl. ext. of ergot has repeatedly produced excessive nausea, compelling its discontinuance, and a resort to the decoction. The preparation of pink root and senna has been carefully tried, and repeatedly by this committee, and with constant failure. That the diagnosis of the presence of lumbricoides has been correct, was repeatedly proved by the subsequent use of santonine, when these parasites promptly presented themselves in the dejections.

Before leaving this class of preparations, your committee take the liberty to object to the "directions for use," which are attached to the bottles containing these preparations by the Messrs. Tilden. It is true they are put on the back of the bottle, or rather on the side opposite the label containing the name of the preparation. They may not be intended to give directions for popular use, but they have that appearance and tone. Certainly physicians do not need, or ought not to

need, such information to be so placed. One of the most, perhaps the most objectionable of those labels, is that upon the cotton root. It reads thus:

"Prepared from the bark of the root. Used as an emmenagogue and parturient. As an emmenagogue it is not inferior to ergot in producing uterine contraction, and more safe. It may be used as a valuable remedy in chlorosis, amenorrhœa, dysmenorrhœa, &c. The cotton root is habitually and effectually resorted to by the Southern slaves for producing abortion, and this without any apparent injury to the general health. Dose, table-spoonful, repeated at discretion."

We are very doubtful of the effects of this drug on the "Southern slaves," but admitting it to be true, such information ought not to be communicated to the public. To produce abortion is, in almost all cases, a criminal action, but one already too common. The assurance that it can be done, without injury to the general health, will add to the frequency of the attempt; and when once the moral sense is blunted by the attempt, if this drug fails, other means will be used. A reliable druggist has informed us that already there is a call for this extract, from persons who can only want it for this purpose, and without the advice of physicians. All the information which the profession requires concerning this preparation, is furnished by the advertisements of this firm, and we trust that they will see the wisdom of removing these explanatory labels.

B, of Solid Extracts.

It is the narcotic extracts that are most commonly used, though gentian, nux vomica, dandelion, &c., are occasionally mentioned by the correspondents of your committee. In examining a series of these preparations as found in the shops, one is struck by the similarity of odor which many of them give. It is perhaps best described as a burnt molasses or burnt liquorice odor. The color is very uniformly in such preparations a dark brown or black, rendering it entirely impossible to distinguish one preparation from another if the labels chance to be lost or misplaced. It is not surprising, then, that they should have lost reputation, especially with the older practitioners. The more recent manufacturers, however, have greatly improved them, and we find that a large number of correspondents are quite satisfied with Tilden & Co's preparations. Their conium is especially mentioned with approval. It would, however, be an improvement if these extracts were made more solid, their softness requiring too much inert powder to be added to them to bring them into a sufficiently solid condition to remain in the form of pills, for which they are chiefly used.

A few of the correspondents of your committee speak very highly of the extracts manufactured by Allen & Co., of England. From the examination made of them by your committee, we are quite confident that these may rank first among those now found in market, and we would call the attention of the Society to them. By using care in the selection of the extract, and *great* care is necessary, and keeping it carefully in glass-ware, good extracts of the solid form will keep a long time. Otherwise, and especially if kept in a damp place, they will mould. The preparations of an inferior quality are pretty sure to mould anywhere, unless they have been boiled, and reduced, till none of the original elements remain unchanged.

As there were some reasons for supposing that the use of Cannabis Indica might be increasing among the people, for the sake of its intoxicating effects, your committee ventured to step so far out of the line of their duties as to inquire concerning this. With a single exception, the answers have been that there is no indication of such use. This fact is one on which we may congratulate ourselves as physicians, for its use could scarce fail to lead to a resort to opium, which already is indulged in to a fearful extent.

C, of Active Principles.

The preparations to which this name is given do not appear to be much used by the profession. Podophyllin is the only one that is spoken of with any frequency. Of this the most various opinions are expressed, some of the correspondents of your committee condemning it as irregular and violent in its action, while others like this and the other similar preparations so much as to use them largely in the place of extracts.

The preparations from different manufacturers vary extremely in their qualities. The color differs, and the effects when administered differ; and no doubt this is one ground, perhaps the main ground, for the different opinions. It is very doubtful if these preparations can be ranked in the same class as quinia, as being the "active principles" of the plants they represent. It is not so precise a process to obtain podophyllin from the mandrake as it is to obtain morphia from opium, and till that certainty in the manufacture can be attained, their use must be attended by some difficulties. One correspondent says it is "a great pity that there is not a uniform standard formula for their manufacture by pharmaceutists." Such a standard would, perhaps, tend to do away with much of the variation in the strength of different preparations, but would not make them fixed substances like the sulphate of quinia and similar salts. From the answers made to the

inquiries of your committee, it would seem that these preparations have not yet attained an established position in the materia medica.

Before leaving this topic, it may be remarked that there are a few of our correspondents who speak of podophyllin as a substitute for calomel. It is more correctly estimated by others as a substitute for scammony or for jalap. Careful observation will show that it resembles calomel in its action but very little, and that resemblance is in its most unimportant peculiarities. It will sometimes produce a tenderness of the gums, but different entirely from the specific effect of mercury upon them; and when the specific effect of mercury is necessary, it would be impossible to attain it by the use of podophyllin.

D, of Sugar-Coated Pills.

The coating of pills and boluses with sugar, has for its object, of course, the concealment of the taste of the drugs. To this, the only objection that has been urged is, that it is putting on a resemblance to some forms of quackery.

This is, however, an objection more theoretical than practical. To those who have used these preparations, it is quite clear that the coating does not affect the action of the drugs, while it does conceal their taste, and patients do prefer them to pills not coated.

Several American manufacturers are in the habit of making them, the best being furnished by the Tildens. The French pills, made according to the U. S. Pharmacopœia, by Garnier, Lamoureux & Co., of Paris, are thus far the best of all that are found in the market; but our makers are gradually rivaling them. Great care must be used in their manufacture, to select the best materials, to mix them thoroughly, to coat them well, or the reputation of the makers will not be established or retained. This, however, is true of the makers of all such preparations. "*Improvements*" by the manufacturers are not generally acceptable to the profession. The manufacturer's duties are rather mechanical, and the introduction of varied formulas should be left to medical men. On the use of these preparations we cannot do better than to quote the remark of one of the veterans of this Society. In writing to the committee he says: "To save an honorable profession, to minister to the health, and save the lives of men, we should use all the arts of chemistry and pharmacy to render medicine palatable."

In conclusion, your committee beg leave to thank the gentlemen who have replied to their inquiries, and respectfully submit this report.

EDWARD H. PARKER, M.D.,
HOWARD TOWNSEND, M.D.,
AUGUSTUS L. SAUNDERS, M.D.

Albany, Feb. 7, 1860.

MONTHLY SUMMARY OF MEDICAL JOURNALISM.

By O. C. GIBBS, M.D., Frewsburg, N. Y.

Reduction of Strangulated Hernia.—In the *Maryland and Virginia Medical Journal* for April, Dr. Stockdell reports a case of strangulated congenital hernia in a child three months old, that was reduced without an operation, in the treatment of which there are some points of interest worthy of making a note of. *Taxis* was tried "under the full influence of an anodyne enema followed by a warm bath;" also, subsequently, "under the influence of an *anæsthetic*," but entirely without favorable results. "A tobacco leaf was procured and thoroughly moistened with warm water, applied to the whole abdominal parietes. At 1 o'clock, its effects being only slightly perceptible in the pulse—the abdominal distention remaining unchanged—it was removed and flannel cloths wrung out of a very strong, hot infusion of tobacco, directed to be applied in its stead and frequently changed." The tobacco was continued from nine in the morning until seven in the evening, when the hernia was spontaneously reduced.

Ovariotomy.—In the April number of the *Md. and Va. Medical Journal*, Dr. B. Roemer, of Otter Bridge, Va., reports a successful case of ovariotomy. We intend that our *Summary* shall contain a record of all such successful operations, performed in this country, the report of which comes to our eye.

Dr. Roemer's patient was 38 years old, and the mother of eight children. The tumor was of three and a half years' growth, and, when removed, it weighed, with contents, 25 pounds. The patient made a good recovery, no symptoms of inflammation having manifested themselves.

Bloodletting in Inflammation.—In the *Lancet and Observer* for April, Dr. J. F. Hibbard, of Richmond, Ind., has a lengthy article upon general bloodletting in the treatment of inflammation. In our *Summary* for April we gave a brief synopsis of a paper upon the same subject by Prof. L. M. Lawson. Dr. Hibbard supports the opinions of Prof. Bennett, while he takes issue with the views and reviews the arguments of Prof. Lawson. Dr. Hibbard believes, with Professor Bennett, that inflammation is the same now that it has ever been, and that the change in treatment is not so much the result of a change in the type or grade of inflammatory action, as it is the result of a change in the views and opinions of practitioners. Though we should be glad to analyze the paper before us, we must be con-

tent with a few quotations. Dr. Hibbard says, "The purpose and effect of general bleeding is to reduce vital action and lessen nutrition; but as the inflammatory fever is the evidence of an already existing depression in vital action and lessened nutrition, and is the thing to be removed, we cannot apply bleeding for this purpose until we are ready to adopt the doctrine that to cure a disease we must amplify its pathology, which would be absurd. And thus we determine a negative answer to the query, whether bleeding can abate or control inflammatory fever in a manner that tends to a restoration of normality. It has already been shown that inflammation, as a local disease, cannot be benefited by general bloodletting. We now arrive at the conclusion that in inflammatory fever it is equally impotent for good, and hence, led by our course and method of study, we are prepared to answer the question, Can general bleeding prevent or arrest inflammation? It cannot.

Theory, therefore, in her own pleasant way, steps in and lends the shoulder of science to support the world-wide practice of the abandonment of general bleeding for the purpose of cutting short or arresting inflammation. And this she does, not by soothing us with the assurance that years ago inflammation was a great behemoth, and we did right to jugulate him, while now it has become a caged animal that we must feed and cultivate to its destiny, but by telling us distinctly that it is the same to-day that it ever was, and that now we have light and see our past errors; we should be true to our manhood and adorn our profession, by being willing on all suitable occasions to acknowledge that we were once in the dark, and honestly did wrong because of that darkness."

Yellow Fever—New Treatment for.—Prof. E. D. Fenner, Editor of the *New Orleans Medical News and Hospital Gazette*, in the fall of 1858 called attention to the use of *veratrum viride and chlorine* in yellow fever. In the spring of 1859 he published full directions for their use. Prof. Fenner's experience was based upon more than 50 cases treated with unusually satisfactory results.

In the same journal for April, Dr. William McCraven, of Houston, Texas, has an article upon the treatment of yellow fever. Dr. McCraven adopted in part the suggestions of Prof. Fenner, and, like him, reports quite satisfactory results. Dr. McCraven usually emptied the stomach in the first place with mustard, or simple warm water; this was followed by a mercurial purge, and when the fever was fully developed he cupped the head, stomach, or back, and commenced immediately with the following mixture:

"R.—Tincture of veratrum viride, ʒj.
Tincture of aconite, ʒj.
Sulphate of morphia, gr. j.
Syrup of orange peel, ʒ iv.

Water to make a four-ounce mixture. Give a teaspoonful every two hours during fever. This was usually continued for thirty-six or forty-eight hours." . . . . "After adopting the course outlined, I have never been more successful. I was at one time in the midst of the epidemic twenty-five days without the loss of a single patient, and I lost but two under this course of treatment. My patients were much relieved, unquestionably, by the emptying, and I think the mercurials were clearly indicated by the quantity of bile; but still I feel assured that the veratrum and aconite influenced the results to a considerable extent. I had heretofore been prejudiced against veratrum in yellow fever; I feared its irritating effects on the stomach, but in practice I found exactly the reverse. I think I cannot be mistaken in the notion that by its influence on the circulation it prevents in a great measure those congestions, both of stomach and kidneys, which terminate so often and so fatally in black vomit and suppression of urine."

New Treatment for Congestive Chills.—In the *N. O. Medical News and Hospital Gazette* for April, Dr. J. E. Keator reports a case of congestive chill, of almost hopeless character, which was promptly relieved by the internal administration of chloroform. He says, "I commenced by giving five drops in a little water. Within less than two minutes after the dose was swallowed the girl remarked that the burning at her stomach was gone, the vomiting ceased, and she seemed to rest a little. I continued giving it at intervals of from ten to fifteen minutes, for nearly two hours, in the same quantity as at first, and each time had the satisfaction of hearing from the lips of the patient herself, that it made her stomach feel so much better that she wanted more of it. At the end of two hours the pulse was full and strong at the wrist, the extremities were warm, and reaction was fully established." Quinine, in full doses, was next administered, another chill prevented, and the patient soon restored to health.

Cause of Goitre.—In the *Louisville Medical News* for March is published an inaugural essay by Dr. N. W. Brown, of Mexico, upon the subject of goitre. It would seem, from the Doctor's article, that this affliction is a very common disease in many parts of Mexico. After eight years of observation in the goitrous districts of Northern Mexico, he concludes that the disease "is produced by the use of

water impregnated with minerals." These minerals are "iron, copper, lead, sulphur, and alum, in their many different forms and combinations existing in nature."

Dr. Brown says we seldom find minerals in Mexico at an altitude above two or three thousand feet, and that up the mountains, above the mineral line goitre does not occur. He says, further, that he never knew goitre to occur endemial "where the inhabitants thus effected did not use water impregnated with *minerals*, quite perceptible even to the taste."

A New Remedy for Consumption.—In the *Louisville Medical News* for March, a writer that we strongly suspect may be Dr. J. Lawrence Smith, in a review of *Headland on the Action of Medicines*, incidentally refers to a new remedy for tuberculosis. The remedy is a combination of fresh *linseed oil and whiskey*. Of it the writer says, "In a reasonable experience of five or six years the results are so encouraging that we have no disposition whatever to fall back upon the more offensive and very expensive article which is said to be obtained from the liver of the cod-fish." . . . . "In the use of the linseed oil and whiskey, we are in the habit of ordering a teaspoonful of each three times a day, and as the stomach becomes accustomed to it, increasing the quantity to a tablespoonful. When they are put in the same bottle and shaken up thoroughly, before use, the taste of the oil is in a great measure covered up by the spirit, and is very rarely offensive even to delicate stomachs." . . . . "It would be mere repetition to go over the words cough, expectoration, hectic, emaciation, night-sweats; but all these things have we seen pass away under the use of the oil and whiskey, and a few months have brought up the patient to normal weight, normal appearance, and normal sensation. It is not designed to claim for the linseed oil any medicinal advantages over the cod-liver; but if it is more certainly pure, if it is cheaper, if it is less offensive, and accomplishes what is claimed for the fish oil, it certainly commends itself as a boon to poverty and to sensitive stomachs, and as such we commend it to the profession."

We think this combination would not be amenable to one of the objections urged by Dr. Bull against whiskey alone—that of inducing intemperate habits!

Inversion of the Uterus.—In the April number of the *Cleveland Medical Gazette*, is published the first part of the deposition of our esteemed friend and preceptor, Prof. John Delamater, in the Fisher case, now pending in the courts of Chicago. In the paper before us, Prof. Delamater gives expression to some opinions in regard to inver-

sion of the uterus that are not in accordance with the traditional opinions of the profession. It is the opinion of the authorities in this matter, that inversion commences by depression of the fundus of the uterus; which depression must have its origin in the last labor. Prof. Delamater thinks that inversion may, in some cases, commence at the neck of the uterus. After describing the manner of inversion by depression of the fundus, he says, "But there are a few cases in which the womb is very differently situated, especially after severe labors, in which the powers of the womb, as well as of the general system, have become exhausted. Frequently such a loss of power and action on the part of the womb, arises from extreme loss of blood, either during the labor, or after delivery, sometimes, notwithstanding that the womb is known to have contracted favorably at the close of the labor; yet falling subsequently into a state of relaxation, extreme bleedings have ensued, and continued until the womb has become as soft and pliable as a wet ox-bladder, while from the entire relaxation, the flow has passed away so freely as to allow of no accumulation within to preserve its cavity and prevent a collapse of its inner surfaces upon one another, insomuch that there may remain no cavity into which the flabby fundus could be depressed. It is evident, as I apprehend, that the process of inversion in such a case must be different from the common opinion of it. I have several times passed my hand into wombs situated precisely as last above described, for the purpose of exciting contraction by the stimulus of the moving hand within it; and sometimes have in that way, also, introduced special agents for rousing it to activity, and revolving such. Cases in my practice have occurred where the smallest special pressure upon it could hardly fail to force it down through its mouth, equally relaxed and void of all resistance, as I believe to have occasionally happened. I have said to myself, it is impossible that in such a case, the inversion should begin by depression of the fundus into the cavity of the organ; but on the contrary, that subject to pressure tending to force it downward, in such a case, it would inevitably be crushed into an irregularly-folded mass, which must emerge from its narrower mouth in an order commencing immediately above the neck. If the mouth were extremely yielding, and the impulsive force adequate, the whole of the organ would be forced through so suddenly as to render it impossible to trace the order of its emergence by the touch, even though the finger were at the moment within the vagina."

Malarial Fever.—That intermittent fever is in some way dependent upon heat, moisture, and vegetable decomposition, for its causatives, has long been the commonly received doctrine among medical teach-

ers. It has been supposed that vegetable matter was all-important, heat and moisture being only necessary to bring about the necessary decomposition to develop and render gaseous the requisite poison. Now and then, a dissenting voice has been raised, and new theories propounded, but, so far, without success in gaining anything like general assent among intelligent members of the profession. It is true, unanswerable objections have been raised to the vegetable origin of the malaria, but each new system has been subject to as many, if not more, equally fatal objections, and the profession, for want of a better, still clung to the old theory.

In the *Nashville Journal of Medicine and Surgery* for January and April, its editor, Prof. W. K. Bowling, has articles upon the subject of malarial fever, in which he gives expression to his views, which, differing from the old theories in regard to the causatives of this disease, are of interest to those who have seen objections to the vegetable miasm theory. He says: "It has been shown again and again, by as truthful and competent observers as ever lived, that every variety of malarial disease exists where no vegetation exists or can exist. And in every such locality, without a single exception, it is in proof that water existed in such a relation to intense solar heat, as to prevent rapid evaporation. What then, if we do find water in the same relation to solar heat in other localities, with decomposing vegetable matter present, when it is demonstrated, that whether it is present or absent, the result is precisely the same.

"Again, it has been repeatedly shown by observers equally as truthful and competent, that vegetation in vast quantities may rot, and fill the air for miles around with its vile stench, where water does *not* sustain the proposed relation to solar heat *without* producing malarial disease, or any sort of disease. Are we to throw aside all these suggestive and precious observations for the poor parrot privilege of repeating forever the words of the great *auctor princeps* upon paludal emanations?"

Prof. Bowling's opinions in regard to the development of malaria are thus enunciated: "A certain relation of watery fluid to long-continued and intense solar heat, always secures malaria, *and nothing else will*, is my own doctrine; and I believe, the only one that will account philosophically for all the facts which we are compelled to admit in connection with the etiology of malarial fever. This relation of watery fluid and solar heat must be such, as that the latter can operate powerfully upon the former, while the former is so situated as to prevent rapid evaporation."

Trismus Nascentium treated with Quinine.—In the *Chicago Medical Examiner* for March, Dr. H. A. Johnson reports a case of trismus nascentium cured by the administration of quinine. Deriving no benefit from previous treatment, he says: "At 11 o'clock in the evening of the second day, thirty-four hours from the first attack, I gave the little patient one grain of sulphate of quinine. In a few minutes a severe spasm came on, differing in no respect from the fifty or sixty that had preceded it. The next interval was a full hour, a longer period than any which had hitherto occurred. The paroxysm was slight and shorter in duration than usual. For the next two hours the patient rested in a sweet and gentle sleep. On awakening, there was a little closure of the jaws, and slight spasm of the muscles of respiration, but nothing in comparison to the fearful contortions that we had previously witnessed. For the next five hours there was not the first symptom of a convulsion, but at 7 A. M. the lips became somewhat livid, and the breathing irregular. This lasted only for a few minutes. I immediately gave another grain of the sulphate of quinine. From that time there has been no symptoms of a return of the disease, and the child is now perfectly healthy." This is Dr. Johnson's second case of cure with quinine, and, if we rightly remember, the same treatment has previously been successfully resorted to in one or more cases.

Treatment of Croup.—Before the Chicago Academy of Medicine, as per report in the *Medical Examiner* for March, Dr. Davis approved the use of the *Turpeth mineral* in croup, which had proved very successful in his hands during a period of nine years. He said "he was in the habit of urging its claims in his lectures to his class, and he relied mainly upon it in the treatment of this disease."

Subcutaneous Injection.—In the several issues of the *Boston Medical and Surgical Journal* for April, Dr. A. Ruppaner has a serial article upon the treatment of neuralgia by the subcutaneous injection of narcotics, &c., illustrated with cases. Dr. Ruppaner holds the following language: "In all cases where the cutaneous, and particularly superficial cutaneous nerves have been the seat of the malady, this treatment has answered my most sanguine hopes. Even in cases of long standing, when combined with appropriate constitutional treatment, I have succeeded in giving relief, for a considerable period of time, to the painfully harassed patient, after all other possible expedients had been tried in vain.

"And let me here append a few words in regard to constitutional treatment in neuralgia, as one of the conditions of success. In almost every case that has come under my observation, a tonic treament has been indicated. I have tried both mineral and vegetable tonics, and

must give the preference to vegetable tonics. I have used the sulphate of quinine in many cases, and in all but one it was followed by good results. I am of opinion that a tonic treatment ought at once to be adopted, with few exceptions; and that the same ought to go hand in hand with the local treatment."

Vomiting in Pregnancy.—Before the Louisville College of Physicians and Surgeons, as per proceedings in the *Medical News* for April, Dr. Thum said "he had found bi-sulphate of soda and crab cider a specific for vomiting of pregnancy." Another member present, whose name is not mentioned, stated that he had a case of very distressing vomiting associated with pregnancy, under his charge, and after failure of all his prescriptions, had advised cold hip baths. The husband had modified this suggestion by pouring a pitcher of cold water down the spine, with prompt alleviation of symptoms whenever resorted to. Several members had used the *oxalite of cerium* with quite satisfactory results in similar cases, and others entirely without benefit.

Hypophosphites in Spurious Hydrocephalus.—In the *Medical Press* for March 31st, we made some remarks upon the use of the syrup of the hypophosphites, in some conditions of the brain in young children, with an illustrative case. That the brain and spinal marrow contain phosphorus largely, is well known, and it is quite probable that deaths occasionally occur from nervous prostration or exhaustion of the nervous centres that might be saved by the timely use of the agent under consideration. We have often thought that the use of strychnine was much neglected in conditions as above, for we know we have seen it operate more satisfactorily than any other known remedy, in the advanced stages of typhoid conditions, and we now take pleasure in calling the attention of the profession to an agent against which there is less popular prejudice, and in the the use of which, there is less danger from careless administration, and which may yet be found to fulfill an indication of no small importance.

Sore Nipples.—In the *Medical Press* for March 31st, Dr. J. B. Amiss, of Va., gives a new cure for that distressing complaint. He says he has employed many times, and with uniform success, the following: "One part tincture of iodine to three of water." . . . . "The iodine wash was applied with a camel's hair pencil, morning and night, *a few days*, when I had the satisfaction of seeing my efforts to relieve my patients eminently successful." We hope that, in other hands, the remedy proposed by Dr. Amiss may prove equally successful; if so, it will prove a great boon to that interesting and worthy portion of the human race whose duty and pleasure it is to bear and nurse children.

Strangulated Hernia treated with Opium.—In the *Chicago Medical Journal* for April, Dr. S. W. Noble has an interesting article upon the above subject. He says: "The treatment that we propose for the relief of strangulated hernia is full and oft repeated doses of opium until complete narcosis is produced. When given in this way, opium will evidently produce a more complete relaxation of the muscular system than any other known remedy. It possesses this advantage over most other relaxing medicines—you can manipulate without giving pain. But on the other hand, if you relax the system perfectly with tartar-emetic or tobacco, and apply the taxis, you cause pain in the parts which excite contraction in the muscles implicated in the hernia, which are the ones you wish to relax. The same objection applies to chloroform, with this slight exception—the patient is not conscious of the pain, and you have not the influence of volition to contend with.

Opium, likewise, when given in large doses, say from three to five grains to an adult, arrests vomiting, which is one of the most unpleasant symptoms, quiets the irritability of the system, and effectually prevents inflammation and mortification in the strangulated portion of the bowel. When the patient is thoroughly and permanently under the influence of opium, if the stricture is not relieved and the bowel returned spontaneously, it may be readily accomplished by a renewal of the taxis. At least, that has been my experience in these cases."

Dr. Noble reports *seven* cases in which the opium treatment has proved perfectly successful, and these, he says, are the only cases of strangulated hernia that have occurred in his practice. On the recommendation of Dr. Noble, Dr. A. H. Luce, of Bloomington, has treated two cases with opium, with success, and Drs. Harrison Noble, of Keyworth, and J. W. Coleman, of Le Roy, have each treated one in the same manner, and with the same results. Thus, *eleven* cases have been reported, with results quite satisfactory. This is certainly an interesting experience, and we have no doubt the suggestion of Dr. Noble will be soon put to a more extended trial.

Stomatitis Materna.—In the *Chicago Medical Journal* for April, Dr. L. S. Ellis has an article upon the above subject. The article gives evidence that its author is familiar both with the disease and its literature. We quote his treatment: "I am accustomed to use the two following prescriptions with uniform success:

R.—Magnes. calc.,	ʒj.
Sapo. hisp. pulv.,	grs. x.
Camphor, "	
Sang. can.,	ää, grs. v.

Mix. Dose from three to five grains, four times daily.

R.—Cinch. Rub.,	ʒss.
Ferri carb.,	
Rad. rhei.,	ää. ʒij.
Port Wine,	Oj.

Ft. mist. Dose, table-spoonful with each meal.

When there is loss of appetite, I direct the tonic to be taken half an hour before eating, and the powder soon after; otherwise, both are to be taken soon after eating. In many cases where there is not much constitutional debility, and in the earlier stages, I find the first prescription amply sufficient to control the disease."

Arsenic in Menorrhagia, Dysmenorrhœa, &c.—In the February number of our *Summary*, we referred to a paper by Dr. A. P. Burns upon the use of arsenic in many uterine diseases; the article of Dr. Burns was published in the October issue of the *American Journal of Medical Sciences*. In the March number of the *Belmont Medical Journal*, one of the editors has the following: "Since reading the above article, we have had an opportunity to test the merits of arsenic in several cases of menorrhagia. In all of them it proved successful, without producing any unpleasant effects. We have used it in dysmenorrhœa and leucorrhœa, with results more satisfactory than anything previously used. We suggested its use to a neighboring physician, in a very alarming case of uterine hæmorrhage from placenta previa, some five weeks before accouchement, where there had been previous attacks of a very threatening character, and at all subsequent attacks it controlled hæmorrhage, but always produced a strong and persistent uterine aching; the woman went her full period, and had a speedy and safe delivery under the care of Dr. Campbell, with no unusual hæmorrhage or untoward symptoms."

Fungoid Growth of the Gums and Jaws.—In the *Dental Cosmos* for April, Dr. W. D. Holbrook reports two cases of fungous growths from the jaw cured by the application of pulverized charcoal, after a failure of a variety of other means. In the cases reported, the fungus had been removed with a ligature, with the knife, with caustics, and with the actual cautery, all to no purpose, as the disease returned with great rapidity. The application should be made frequently, and the remedy persevered in for several weeks.

Iodide of Potassium in Neuralgia.—In the *Maryland and Virginia Medical Journal* for March, (the proprietors will please accept our thanks for the back numbers of this excellent Monthly,) Dr. F. P. Bibby has an article upon the use of iodide of potassium in neuralgia. He says: "I can say, after some experience, that there is no remedy

which seems to be more beneficial in neuralgias than the iodide of potassium, in full doses. Exciting the secretions and excretions, it may be supposed to act by eliminating the morbid cause; and in this way, probably, we see its good effect in chronic rheumatism, chronic syphilis, and other analogous conditions, and for the same reason it may be expected to cure neuralgic troubles generally."

Iodide of Potassium in Diseases of the Brain in Children.—In the *Maryland and Virginia Medical Journal* for February, is copied an article upon the above subject, from the *Edinburgh Medical Journal*, from the pen of John Coldstream. The editors of the *Md. and Va. Med. Journal* subjoin the following note: "We can fully endorse the benefit of this remedy in tubercular meningitis, if there is any reliance to be based upon a diagnosis made most carefully. During the past year, two cases happened to us in consulting practice, and in neither case was there a difference of opinion with any of the physicians concerning the nature of the disease. This modest but able paper of Dr. Coldstream has forestalled an account of the cases which we had drawn up for publication. But the views here expressed so completely anticipate our own, at the time the paper was written, that we are glad to find a more entertaining substitute by endorsing this."

We are glad to see this able evidence in favor of a plan of treatment we have pursued for years, and also, the still more able endorsement. Mercury and bloodletting, the text-book remedies for hydrocephalus, or rather tubercular meningitis, have done quite too much injury in these cases, and we trust in future reliance may be placed upon safer and more appropriate remedies. In the paper of Dr. Coldstream, surprise is expressed that so few references are on record of the use and utility of this remedy in head affections of children. He makes allusion to such as have fallen under his observation.

We do not complain that he has left our humble name out of the list, but we take pleasure in referring Dr. Coldstream and his endorsers to a paper of ours upon the same subject, published in the January No. of the AMERICAN MEDICAL MONTHLY for 1856; also to another in the March No. of the *Medical Examiner* for 1853. In the article first named, we used the following language: "I wish to call more especial attention to the remedial powers of iodide of potassium. In meningeal tuberculosis I believe it to possess an influence second to no other known remedy." . . . "I have used it in several instances with success, in cases that I supposed to be meningeal tuberculosis; cases, too, some of them, in families of which several of the children immediately preceding had died of the disease under consideration, as

they respectively became of a certain age, having received the usual antiphlogistic treatment at the hands of eminent and skillful physicians."

For the last eight years, we have used the iodide of potassium in tubercular meningitis, as well as in other head affections of children, and the results have been such as to induce us, on several occasions, to recommend its use to others in similar cases. We will conclude our remarks upon this subject by a quotation from the paper of Dr. Coldstream: "My own experience leads me to regard the iodide as more likely than any other drug to promote this desired end; and my confidence in it, as the remedy best adapted to all stages of tubercular diseases of the head, is so strong, that whatever else might be done or left undone, I would persevere in administering it, even in circumstances the most desperate."

REVIEWS AND BIBLIOGRAPHY.

Therapeutics and Materia Medica: A Systematic Treatise on the Action and Uses of Medicinal Agents, including their Description and History. By ALFRED STILLE, M.D., Late Professor of the Theory and Practice of Medicine in the Medical Department of Pennsylvania College, etc., etc. Philadelphia: Blanchard & Lea. 1860. Two Vols., 8vo.

Is a new work on Therapeutics needed? This question the author of the treatise, the title-page of which prefixes this article, of course propounded to himself before engaging in the labor of writing two large volumes on the subject. The work itself is his answer to the question. We are of opinion that he was right in answering it affirmatively. Without disparagement of the works which have appeared on this subject within the past few years, it has received far less attention than other departments of medical knowledge, and it claims from medical writers more attention than it has received. We can readily understand that, in surveying the domain of medicine in order to select a portion in which bibliographical labor could be rendered most useful, Dr. Stillé was led to choose the subject of therapeutics. The next question which an author would be likely to ask of himself is, Am I the proper person to write a work on the subject proposed? This question, also, our author virtually answers when he enters on the task of writing the work. Here, too, we believe the author, in this instance,

has not misjudged. In fact, among those in our country distinguished as medical writers and teachers, we know of no one more competent to prepare a work on therapeutics, having the character and scope of the one before us, than Dr. Stillé. A man of scholarly attainments, familiar with medical literature, a clear thinker, an elegant writer, a good observer, a conscientious truth-seeker, he possesses the qualities of mind admirably suited to an analytical investigation of our present knowledge of the subject, together with the rare ability of communicating to the reader didactic information in a systematic, lucid, and attractive manner. An examination of the treatise will, if we are not mistaken, afford confirmation of the fitness of the author to the work which he has performed.

We do not intend to write a critical review of Dr. Stillé's treatise. It covers so much ground that the reviewer would require more space than is consistent with the limits of this journal. Nor do we profess to speak of the merits of the treatise after a thorough, careful perusal. Our object in this notice is simply to furnish our readers with an account of its general plan, and the arrangement of topics, with the impression which we have formed after an examination, as yet, of necessity partial.

It is not a treatise on materia medica and therapeutics, but essentially a work on the latter subject; the consideration of medicines, in their physical, chemical, and physiological relations, holding a subordinate place, and, in fact, receiving comparatively little attention. To quote the author's language, the point of view from which the treatise has been written is rather of the bedside of the sick than in the laboratory or the lecture-room. The therapeutical considerations, however, are, for the most part, presented in connection with the different classes of remedies. The Introduction occupies somewhat less than one hundred pages. We should have been glad to have seen a much larger space devoted to General Therapeutics, but we are well aware that this was difficult in a work comprehending the whole range of special therapeutics. The following topics are considered in the introduction: Sources from which medicines are derived; sources of knowledge in therapeutics; sources of knowledge respecting the action of medicines; the physiological action of medicines; the local action of medicines; the remote action of medicines; absorption; the avenues by which medicines are introduced, and the effects which they produce; the curative action of medicines; influences modifying the effects of medicines; the administration of medicines; the art of presenting, and the classification of medicines. These topics are quite sufficient

in themselves for a large volume, and, for one, we should be glad to read such a volume from the pen of Dr. Stillé.

Of the foregoing list of topics, that which possesses especial interest and importance is the sources of knowledge in therapeutics. While we accord fully with the views presented by the author under this head, we cannot but regret that he did not consider the topic at greater length. There can hardly be a point in medical philosophy more interesting or important than an inquiry into the modes by which therapeutical knowledge is obtained. We agree with Dr. Stillé when he says, "Experience is really, as well as rationally, the only ground upon which curative effects can be expected from medicines." But in order for this truth to be received by all minds, it would have been well to have entered into a fuller consideration of the grounds on which it rests, and to have shown how it does not conflict with the practical application of physiology and pathology to the study of therapeutics. The plainest and simplest rational inferences from pathological conditions, as to the indications for certain remedies, demand the results of experience to convert these indications into therapeutical principles. Thus, what can apparently be clearer than that an offending substance in the stomach is to be evacuated by an emetic? Yet the fact that certain substances act as emetics, the efficacy of an emetic under these circumstances, the particular kind of emetic to be employed, the mode of administration, &c., are only to be determined by experimental observation. It is equally to be inferred from the knowledge that certain diseases depend on a *materies morbi* in the blood, that it is desirable either to neutralize or eliminate this morbid material; but whether it can be neutralized or eliminated, and if so, by what measures, must be determined by experience, and by experience only. How is medical experience to be obtained? What are the different methods of experimental observation? What the difficulties and liabilities to error in prosecuting these methods? How are the results of experience to be made applicable to individual cases of disease? These and other questions lead to considerations bearing directly, and, if we may use so strong a term in this connection, momentously on medical practice. We know of no one better qualified to discuss these points than Dr. Stillé, and we should have been glad to have seen a much larger space devoted to them.

The author arranges medicines into twelve classes, viz.: Lenitives, astringents, irritants, tonics, general stimulants, cerebro-spinal stimulants, spinants or tetanics, general sedatives, arterial sedatives, nervous sedatives, evacuants, and alteratives. This arrangement is per-

haps as good as any that can be framed, with our existing knowledge of the effects and *modus operandi* of different remedies. The several classes are treated of successively, in the order in which they have just been enumerated. First, are considered the general principles of therapeutics involved in each class, and then the results of experience, their action in health and disease, etc., of particular remedies belonging to the class, together with the practical rules regulating their employment in the treatment of diseases. The aim of the author is to present a fair representation of therapeutics in so far as the labors of medical observers of the past and present time afford a basis of facts and principles. As the author justly remarks, "it is impossible in such a work to present in detail the observations, or even the conclusions, of medical writers; and therefore," he adds, "while it has been attempted to furnish a truthful, although a succinct account of both, numerous references to original sources of information are provided for those who desire to prosecute the investigation. These consist of ancient classical authorities, and modern writers of the highest reputation in the Italian, French, German, and English languages, whose observations have been preserved in special essays, or in that great repository of facts, the periodical medical literature of the present century." Mere references constitute a very useful feature of the work. The author says further, (quoting from the preface,) "It seemed as if a treatise executed in so catholic a spirit, and with no conscious bias towards any sect or school, ought to contain a large proportion of solid and useful truth." We believe that it does contain a large proportion of solid and useful truth, and with this belief, we most cordially commend the work to those who may honor this brief notice with a perusal.

A Guide to the Practical Study of Diseases of the Eye, with an Outline of their Medical and Operative Treatment. By JAMES DIXON, F.R.C.S., Surgeon to the Royal London Ophthalmic Hospital, Moorfield; formerly Assistant-Surgeon to St. Thomas' Hospital. From the Second London Edition. 12mo, muslin, pp. 425. Philadelphia: Lindsay & Blakiston.

This volume has already been five years before the profession, and will not require an analysis at our hands. The treatment of eye diseases has become somewhat of a specialty, especially operative treatment. It is, however, none the less important that every physician acquaint himself as thoroughly in regard to such diseases as any other. It is not every physician who will be called upon to perform the most

difficult and delicate operations upon the eye; but he should be prepared to give judicious advice, and acquaint his unfortunate patients of the full resources of our art. Diseases requiring operative treatment are much less common than those demanding medical aid; and however thorough may be the physician's knowledge in regard to eye diseases, that knowledge will find frequent requisition in the discharge of his every-day duties. There are but few, if any, diseases under which the sufferer is more impatient, or more thankful for relief.

The work before us is much less voluminous than Lawrence's or Mackenzie's upon the eye, and on this account, is preferable. In this age of many books, great voluminousness is a great objection, especially in a text-book for the busy practitioner. Dixon's work has another and still more important advantage over the encyclopædial works just referred to: It is of more recent authorship and issue, and thoroughly posts the student in all the modern improvements in diagnosis and treatment of eye diseases. To the general practitioner we recommend the work before us, with pleasure, confident that it is, perhaps, the best work for his use on the subjects upon which it treats, to be found in the English language. This second edition is somewhat enlarged from the former edition, and several of the chapters have been rearranged and rewritten. Should another edition be called for, we would suggest one improvement that would greatly facilitate the convenience of the work for reference. The book is without an *index;* the addition of one, carefully prepared, would greatly enhance its value. A *table of contents*, however copious, will not supersede the necessity of an alphabetically arranged index. The mechanical execution of the work is unexceptionable. O. C. G.

EDITORIAL AND MISCELLANEOUS.

— The large amount of original matter, and the presence of an index in this number, must be our apology for the brevity of our editorial. Several reviews and notices of books have been deferred to another month, and the Proceedings of Societies we have been obliged to omit altogether. In commencing a new volume, we shall endeavor to make such a disposition of our pages that each department shall receive its proper quota, and a greater variety be given to our readers. We have to beg the indulgence of those of our correspondents whose articles have been deferred, and in closing this volume, we do so with the intention of improving upon it in our next.

— Two volumes of the publications of the New Sydenham Society have recently been received, which make five volumes issued by this Society for the year 1859. We learn from the report of the Council, that there are over 2,000 subscribers to their publications, and the list is rapidly increasing. With an increase in the amount received from members, the frequency of the publications will increase. Should the list reach 3,000, the Council propose to issue, in addition to the works already agreed upon, an Atlas, containing three of Hebra's Illustrations of Skin Diseases. This latter work would be worth the price of the subscription alone, and will constitute, when completed, the best and most magnificent Atlas of the kind ever issued. Besides this, the publications for 1860 will be:

Clinical Memoirs on Abdominal Tumors and Intumescence, by Dr. Bright.

A Year Book for 1859: Being a Register in condensed Abstract of all important communications, whether British or Foreign, in Medicine, Surgery, and their allied Sciences during the year.

Frerich's Clinical Account of Diseases of the Liver.

Vogel and Neubauer on the Examination of the Urine.

The subscription price to this Society is but $5.25 a year. Dr. C. F. Heywood, No. 66 West Twentieth Street, is the Local Secretary for New York.

— A new book by Dr. Alfred C. Garratt, of Boston, is soon to be issued by Ticknor & Fields, of the same city. It is entitled the *Medical Uses of Electricity in the Treatment of Nervous Affections.* It will be a thoroughly systematic work, of over 700 pages, and nearly 100 cuts, showing not only the best methods for the therapeutical employment of electricity in the various nervous affections, but also showing the anatomy of the parts to be involved, and a concise view and means of diagnosis of the great variety of nervous diseases met with every day. The work proposes to fill a vacancy which exists in medical literature upon this subject.

— *A Maison de Santé* has recently been opened in New York, the announcement of which, we believe, will be received with pleasure by the profession. The arrangements are such as will be highly beneficial to the interests of any physician who may have a patient requiring careful attendance, or who may need the comforts of a home. It is under the professional management of Dr. Henry Schweig, and is located in Second Avenue, near Ninth Street. We shall give an account of this establishment in our next number.